PETROLEUM WEEK

SEPTEMBER 13, 1957

■ A McGRAW-HILL PUBLICATION

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Goal: More oil at lower costs from known reserves . . 47

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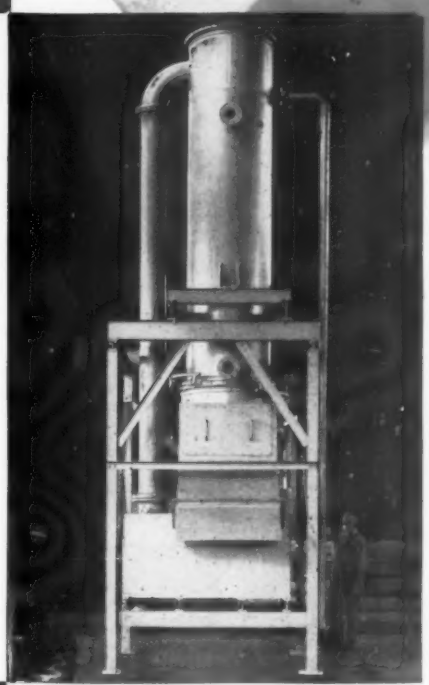

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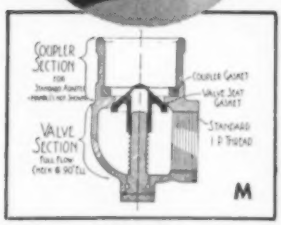

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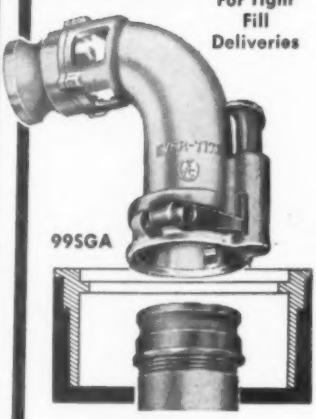

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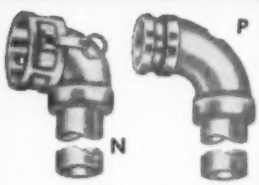

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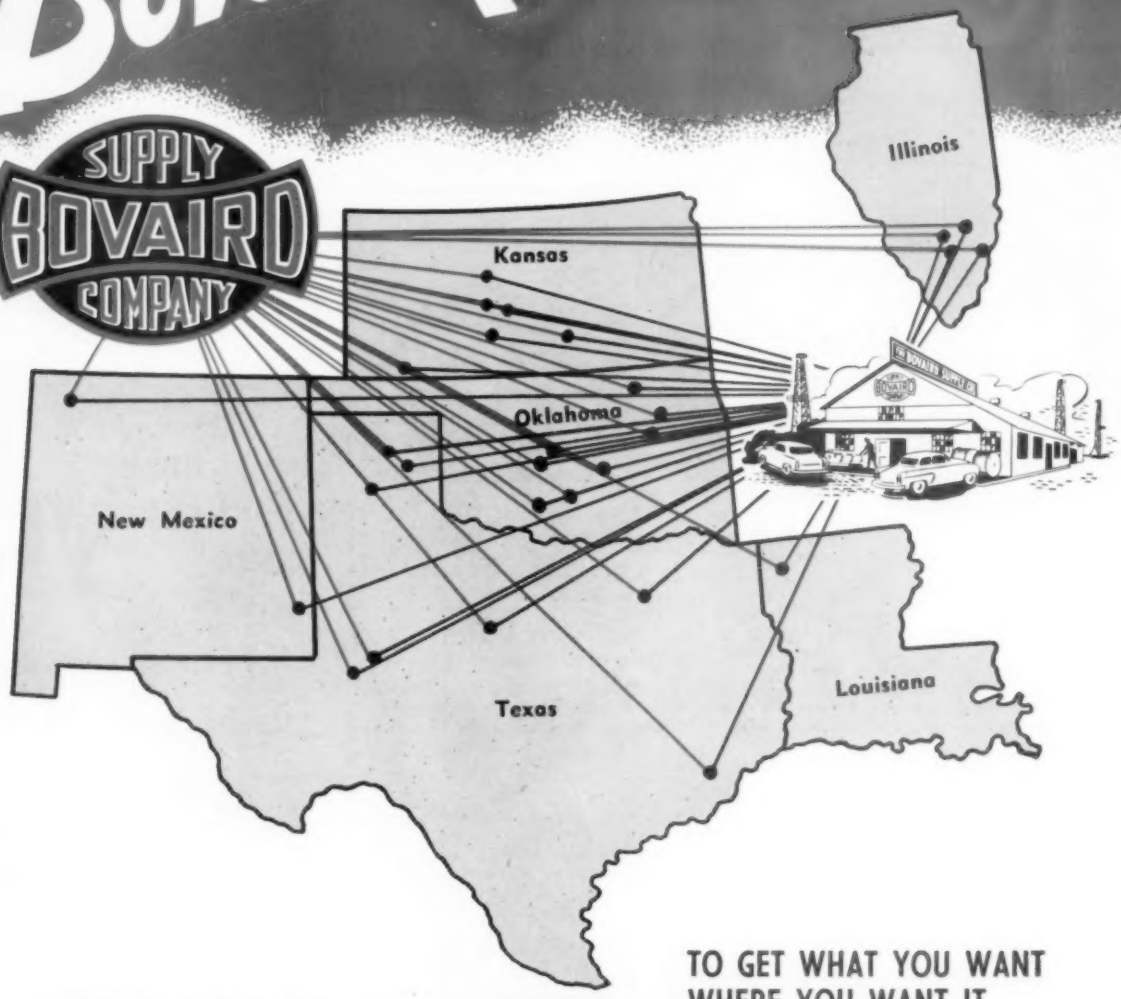

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60-Second Summary / WHAT'S HAPPENING IN OIL

AT-A-GLANCE PETROLEUM WEEK Copyright

September 13, 1957

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The first of several alternate plans to control crude imports were offered in Washington this week. Indiana Standard, the largest net buyer of U.S. crude, says the government's plan favors the large, established importers. It wants quotas pegged to a percentage of refinery runs. And Tidewater has its own version of a refinery run plan for imports control. . . . **pp. 6, 11**

•

Alberta has revised its proration plan, and changes may be made in Louisiana. Alberta is retaining the depth-bracket method but will favor deeper wells and those with high producibility. Some Louisiana producers want to switch from the depth-bracket formula. . . . **p. 12**

•

A battle for heating markets is shaping up in the Pacific Northwest. Oil still holds the biggest share of the market, but natural gas, the newcomer, is making big inroads. And electric power gives both fuels stiff competition. . . . **p. 73**

•

Union Oil is attempting the first crestal-drive waterflood in California. It is being used because of the irregularity of the oil-water contact and the decreasing oil-sand thickness from the crest down the flanks of an anticline. . . . **p. 26**

•

A new corrosion inhibitor has been developed to protect tubing under high pressure and temperature. The compound is designed to withstand the effects of acidizing, mud cleanout, fracturing. . . . **p. 21**

•

Producers have high hopes that oil recovery can be increased and costs cut with new and improved oil techniques. A new chemical method of plugging off water zones holds much interest. Producers also expect greater use of enriched gas drives, thermal techniques, and multiple well completions. . . . **p. 47**

•

A Denver drilling contractor is holding its own training "institutes" for rig crews. Three-day sessions, on supervision and better work methods, are Carpenter-Trant Drilling Co.'s answer to the oil field rate squeeze. . . . **p. 40**

•

Electronic brains are making for important savings in design and cost estimates of refinery equipment. Esso Research & Engineering Co. this week told how it may save $1-million on one unit by using a computer this way. . . . **p. 78**

•

Automatic sequence control systems can be adapted to gas turbine compressors for remote gas-line operations, two engineers told this week's meeting of the American Institute of Electrical Engineers. . . . **p. 34**

Up to the Minute

SIGNIFICANT LATE NEWS

September 13, 1957

Strong arguments for revisions in the oil imports formula were made in Washington this week, particularly by firms who feel the present plan hits them harder than it does anyone else. Companies heard this week were Indiana Standard (page 11), Sohio, and Tidewater.

Tidewater's president, D. T. Staples, said his firm's "allowable" amounts to confiscation. His company wants to import 54% of its East Coast refinery needs, which it claims its competitors will be able to do (PW—Sep.6'57,p9). Unless it gets relief, Staples doesn't see how Tidewater's big new refinery in Delaware can be operated economically.

Capt. M. V. Carson, imports administrator, tended to discount Tidewater's argument. He said Tidewater's competitors are getting far less than 54% if the whole District 1-4 area is considered, rather than just the East Coast.

•

The race for Sahara oil permits is gathering speed. This week British Petroleum announced interest in a joint bid with French partners. And Sinclair Petroleum and Newmont Mining Corp. signed with a French group for exploration of acreage already requested. The U.S. companies will hold 27% and 18% respectively.

•

The oil industry's capital spending shows some signs of tapering off. A government survey, released at midweek, shows that oil's fourth-quarter spending is apt to drop below that of the third quarter, and below the fourth quarter of 1956. Even so, spending for the entire year will set a new record, and the industry's pace will still be an extremely fast one.

•

The summer-long weakness in tanker rates is forcing lower crude prices at the Eastern Mediterranean. Esso Export this week cut its f.o.b. price for Arabian and Iraqi crudes at Eastern Mediterranean ports by 10¢ a bbl. to $2.59 a bbl. for 36-36.9-gravity oil.

The new price for the pipeline-moved oil is equal to a tanker rate from the Persian Gulf of about USMC—35%. That rate is about equal to the current market for five-year term charters—the real competitive influence on Eastern Mediterranean prices.

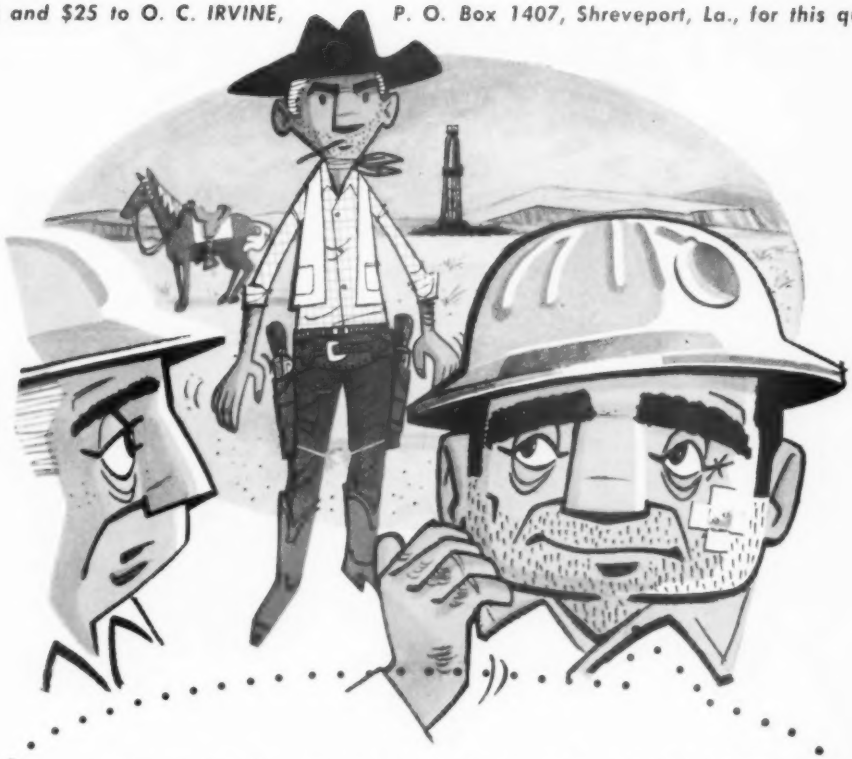
•

Socony Mobil has purchased one of the largest gasoline and fuel oil distributors in Chicago: George C. Peterson Co., a Socony distributor for many years.

•

Sun Oil Co. is taking sharp issue with Louisiana's first rateable take order. Directed to buy rateably in the University field after a producer had complained he had no sales outlet (PW—Sep.6'57,p15), Sun gave notice that, instead, it would cancel its purchases from another producer, effective Dec. 1. Thus, Sun would do no buying in that field. A rehearing on the rateable take order was held this week. A decision is expected soon.

Congrats and $25 to O. C. IRVINE, P. O. Box 1407, Shreveport, La., for this quip.



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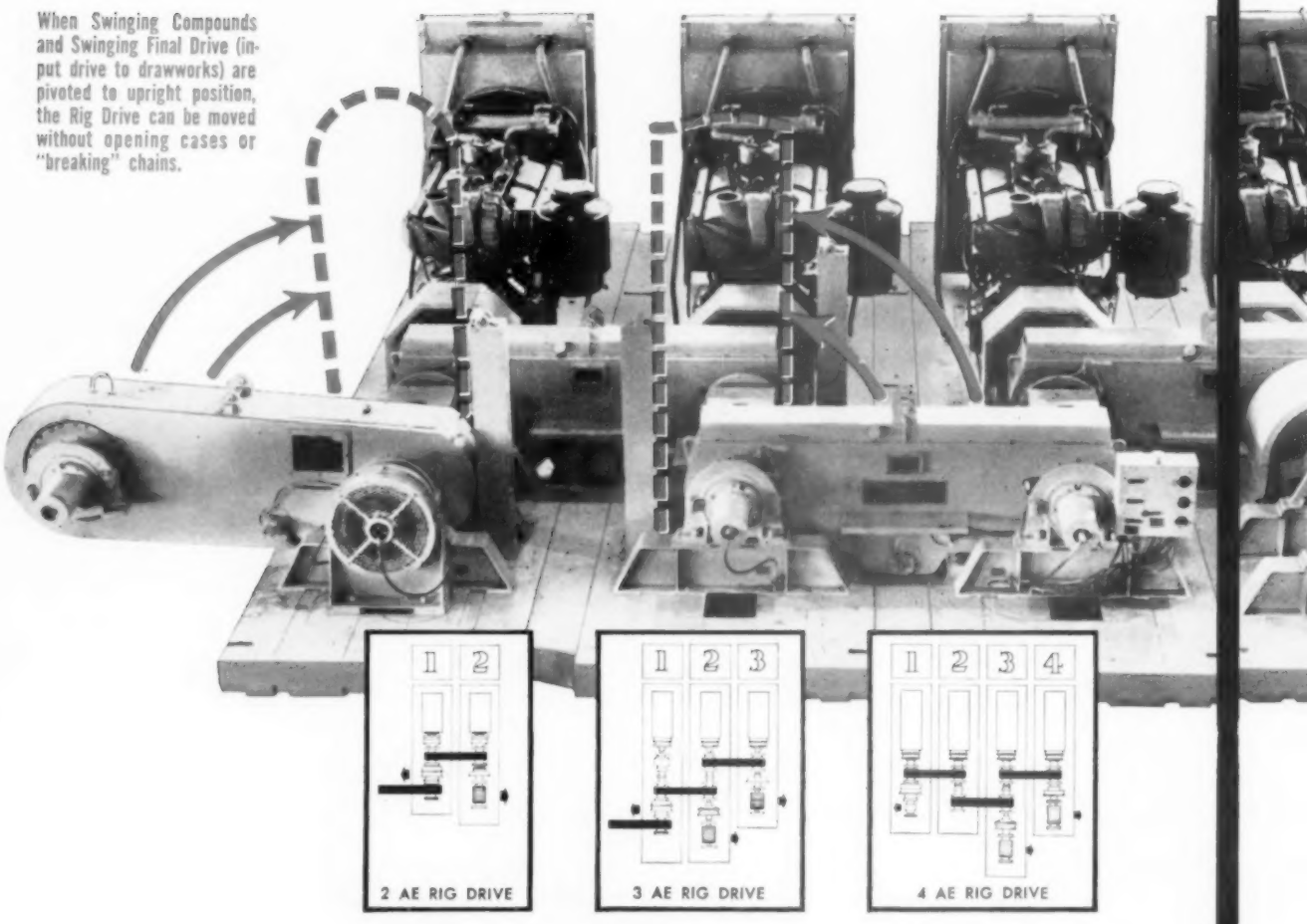

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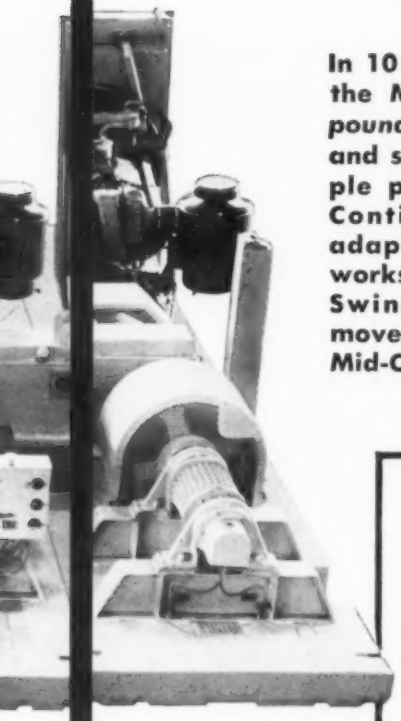

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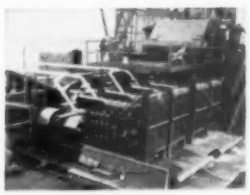

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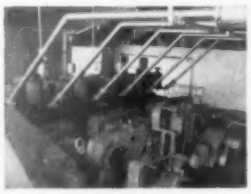

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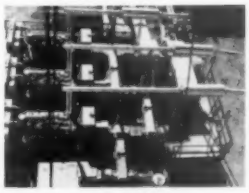

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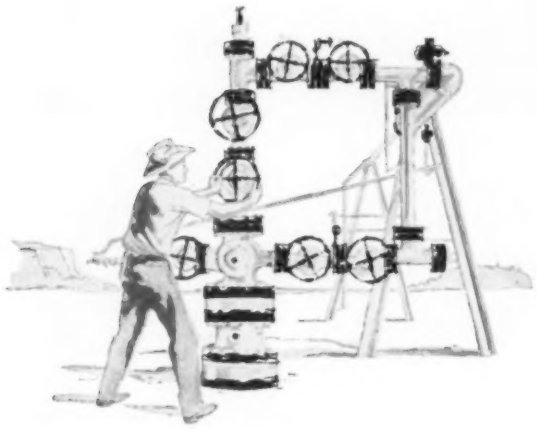

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El Paso Natural Gas Company and its subsidiaries serve California, West Texas, Arizona, Idaho, Nevada, New Mexico, Oregon, Utah and Washington.

EL PASO NATURAL GAS COMPANY

New Imports Formulas Proposed

Unhappy importers listed their complaints against the government's imports plan this week—and proposed their versions of better solutions.

Navy Capt. Matthew V. Carson, administrator of the Eisenhower Administration's new effort to put the lid on crude imports, launched a series of hearings on Tuesday into objections against the voluntary import "allowables" announced by the White House on July 29 (PW—Aug.2'57,p12).

The plan allows crude imports of 756,000 b/d into districts 1-4, and assumes imports into district 5 will not exceed 275,000 b/d—although the latter imports are not included in the restriction plan.

Carson heard testimony this week from officials of Standard Oil Co. (Ind.), Tidewater Oil Co. (page 6), and Standard Oil Co. (Ohio). Eastern States Petroleum Co. will present its case Sept. 17, followed by International Refineries, on Sept. 18.

All five companies are "new" importers—defined by the government as those who brought in less than 20,000 b/d of foreign crude in 1954.

Indiana Standard, leading off the hearings, was sharply critical of the edge the program gives to long-established importers and those who ignored the government's past pleas for restraint.

John E. Swearingen, executive vice-president of Indiana Standard, made it clear that this company will cooperate with the voluntary program through June, 1958.

But he called his company's imports allocation of 29,800 b/d "inequitable and discriminatory." He urged that Indiana Standard be granted an increase to 53,500 b/d.

Swearingen lodged these basic objections to the government formula:

- By keying "allowables" to a historical base, it penalizes companies such as Indiana that were late getting into the imports picture, and that have heeded past government requests to hold down imports.

"We will be penalized in the future because of our cooperation in the past," says Swearingen, recalling that Indiana's imports increased only from 15,500 b/d in 1954 to 17,800 b/d in 1956. "Had we started our Yorktown (Va.) refinery one year earlier," he says, "our imports in 1956 would have been about 30,000 b/d higher, and we would not now be requesting relief."

- The formula abandons ODM's previous position of giving preferential treatment to Western Hemisphere crude.
- It allows established importers to fill 15% of their requirements in Districts 1-4 with low-cost foreign oil, while permitting Indiana Standard imports amounting to only 4.5% of its refinery demand. Even other newcomers, as a group, would be allowed to bring in foreign crude for 11.8% of their needs, says Swearingen.

Swearingen cites the case of Sun Oil Co. which, like Indiana Standard, imported around 15,000 b/d in 1954. But he says the government program allows Sun to import over 20,000 b/d more than Indiana Standard during the next year—"despite the fact that our crude oil demand is more than double Sun's."

- The restriction program is aimed at preserving the domestic industry. Yet, Indiana Standard—the largest net buyer of domestic crude—is allowed a smaller cut of the imports pie than its competitors.

In a proposal that is bound to meet sharp reaction from established importers, Indiana Standard suggests that each importer be allowed to import either 9.6% of his refinery runs in Districts 1-4 or the allowable cited by the government—whichever is greater. Swearingen bases his proposal on the fact that the government's formula allows imports into Districts 1-4 totaling 9.6% of domestic demand in the area.

"The principle of equal opportunity," says the Indiana Standard official, "should permit each refiner in Districts 1-4 to import at least that same percentage of his refinery demand if he desires."

The net result would be to increase the allowable imports into Districts 1-4 by 36,500 b/d. Indiana Standard and Standard Oil Co. (N. J.) would be the immediate beneficiaries.

All other importers would come out better by taking the allowables already set by the government.

However, the rub for established importers would be this:

Presumably, they would not be allowed to share in domestic demand increases until their imports came down to 9.6% of their refinery demand. Thus, they would eventually lose their historic advantage on imports.

In Swearingen's view, future importers also should be allowed to bring in up to 9.6% of their needs from overseas. Thus, the over-all share of foreign oil in the U.S. market would increase to the extent that it was not offset by increases in demand.

The reaction of other companies to the alternative plans proposed this week should become apparent soon.

Under the procedure set up by Carson, cross-examining by other interested parties is not allowed during the hearing.

However, other importing companies and independent producer groups may file comments within seven days after the hearing.

Private reaction in the hearing room this week indicated that neither established importers nor other newcomers are likely to swing in behind the Indiana Standard proposal.

It is highly unlikely that the Administration will make any fundamental changes in the formula itself—though some adjustments in allocations may be made after the hearings.

The refinery-run approach to the imports problem was considered, but discarded, by a Cabinet committee in its study in July.

Carson is not expected to announce the government's conclusions on the hearings before October.

He has said each company's case will be considered separately, with decisions being withheld until all companies have been heard.

However, industry sources speculate that, from a practical standpoint, the Administration will have to weigh one appeal against another in order to avoid breaking the voluntary program apart at the seams.

The Administration must tread carefully, because the granting of any substantial imports "allowables" above the level now recommended by the government would result in a serious push for legislation next year imposing tough mandatory controls.

Proration: Alberta Changes Plan

Future crude allowables will favor the deeper wells with the greatest ability to produce.

Alberta will institute a new oil proration schedule in January that is designed to provide a greater incentive for deep drilling, with emphasis on productivity.

The new plan was announced last week by the Alberta Oil & Gas Conservation Board. It represents a compromise between various proration methods proposed to the board at a hearing last May. It will result in higher allowables for the deeper wells and a slight reduction in the allowables assigned to shallower wells.

Under the new plan, well allowables will be based on an "economic allowance," maximum productive ability, and market demand for Alberta oil. The latter factor will establish the actual well allowable, which will fall somewhere between the "economic allowance" (in effect, the minimum well allowable) and the maximum productive rate (the maximum allowable).

The "economic allowance" is a two-stage schedule based on depth brackets. The first stage, the "initial economic allowance," is the allowable assigned to new wells for a maximum of seven years.

According to the board, such an allowance reflects "more or less the operating costs, a five-year payout of drilling costs, and a two and one-half-year payout of completion costs." But the two payouts cannot exceed seven years.

No consideration was given to either royalty or deferment income, nor are there any provisions in the allowance schedules for changes in cost factors or price.

The initial allowance ranges from a minimum of 30 b/d in the 0-3,600-ft. bracket to 190 b/d for wells in the 14,901-15,000-ft. bracket.

For fields already discovered, the initial allowance will apply for shorter periods than the seven-year maximum.

The second-stage allowance, an "operating economic allowance," will apply after the end of the seven-year initial allowance.

The operating allowance "reflects more or less the operating costs and the continuation of the two and one-half-year pay-out of completion costs," the board reported. It explained that the continuation of the pay-out of completion costs serves to cover equipment replacement and other additional costs incurred during the life of a well.

The operating economic allowance ranges from a minimum of 25 b/d for wells in the 0-4,300-ft. bracket to 73 b/d for wells in the 14,701-15,000-ft. bracket.

The economic allowance factor in setting well allowables appears satisfactory to most operators. But some have expressed concern over the new application of producibility in establishing allowables.

Under the existing plan, the prorated well allowable is an economic allowance plus some fraction (based on market demand) of a well's maximum productive ability—the MPR.

Effective Jan. 1, 1960, the Alberta board will switch to a "residual MPR plan." That means that the prorated well allowable will be equal to the economic allowance plus some fraction of the difference between the MPR and the economic allowance.

In 1958 and 1959, the Alberta allowable will be determined exactly as it is now, except that the new economic allowances will be used.

Some producers claim that under the new emphasis on productive capacity in determining allowables, many wells that have had relatively high allowables but low productive ability rates will be cut back sharply.

One leading Canadian producer says that the "residual MPR plan" favors the reef fields, such as Leduc, Redwater, Golden Spike, Bonnie Glen, and Wizard Lake, all of which have a relatively high MPR. On the other hand, he says, a field like Pembina, which has been accounting for about 25% of Alberta production, will be cut back because of a lower MPR.

Yet the productive depths at Pembina, he notes, are about the same as in some of the fields.

Taking a long-range view, the Alberta board says that if the new economic allowance should encourage drilling unnecessary wells, then the board may order wider spacing.

Present well spacing in Canada ranges from 40 to 160 acres.

Louisiana Studies New Formula

Louisiana this week launched a critical study of its much-debated oil proration system. The purpose: possible revision to meet objections raised by many oil operators.

A committee of oil operators, named by Conservation Commissioner John B. Hussey to assemble necessary data, held its first meeting in New Orleans. Each committee member represents a producing field in the state.

Major target of criticism is the depth-bracket formula, under which well allowables are fixed each month.

The formula relates allowable crude production to well depth—on the simple economic theory that deeper wells are entitled to greater allowables in order to offset higher drilling and production costs.

The basic depth-bracket formula was established in 1953. It set up allowables for producing zones of various depths: 0-2,000 ft.; 2,000-3,000 ft.; and on down to 16,000 ft. Wells 16,000 ft. deep or more all have the same allowable. Offshore wells receive higher allowables because of their higher costs.

Since 1953, monthly allowables have been fixed as a certain percentage of the basic formula. Thus, the current allowable is 35% of the basic formula.

Operators holding large reserves contend that the formula is unfair because it keeps too tight a lid on their production.

They point to the fact that only 20 of the state's several hundred fields account for half of the state's reserves—but that they are not producing anywhere near half the state's crude.

They would like to have crude reserves included in some fashion as a factor in determining allowables.

Operators of wells in Louisiana's extensive marshlands argue that the present formula doesn't give them a return commensurate with costs.

The depth of a well, they say, is no criterion on which to base the return, in terms of crude production, that is required.

They point to the fact that many marsh wells cost just as much to drill and operate as do offshore wells—yet their allowables in most cases are lower.

Lengthy study will be required before any recommendations for

changes in the proration system evolve.

"We are not going to change the proration system immediately," says Thomas M. Winfiele, chief engineer of the Louisiana Dept. of Conservation. The department will be represented at all committee sessions.

As the committee work progresses, additional fields may be added to those represented by the eight men originally named.

Fields represented, and their chairman, are:

- Avery Island and North Crowley fields—O. L. Furse, Humble Oil & Refining Co.
- Jeanerette field—John Garrett, Atlantic Refining Co.
- Eugene Island, Block 126—A. H. Massad, Magnolia Petroleum Co.
- Bayou White—B. L. Francis, The Texas Co.
- Venice—Mervil Tubbs, Tidewater Oil Co.
- South Pass, Block 24—E. B. Haymon, The California Co.
- Newlight field—C. W. Byron, Chicago Mill & Lumber Co., is the probable committee man.

New Limits for Gas Use?

Gas pipeliners like "interruptible" sales, but an FPC official warns of dangers they may bring.

Federal Power Commissioner William R. Connole called this week for a national fuels policy, which, he said, is "absolutely indispensable." He also said that increasing dependency on "interruptible" sales might wreck the gas industry.

Speaking at the Independent Natural Gas Assn. of America's Houston meeting, Connole declared:

"The American energy picture is approaching a critical stage. We face the need for immediate formulation of a sound national fossil-fuel policy, with the government coordinating and streamlining its efforts, and with the industry and consumers assisting by sound planning for future growth and use.

"We who are intimately involved in the future of the natural gas industry can do our part by reappraising traditional approaches to the question of whether a proposed pipeline expansion is economically sound."

Connole underscored two warnings:

- That unwise expansion will inevitably hasten fossil-fuels bankruptcy.
- That uneconomic pricing to maintain artificial volumes contains the seeds of its own destruction.

Connole hit hard at any tendency of pipeline companies to make "interruptible" sales of natural gas without adequate consideration of price and of the competitive outlook.

The commissioner said the gas industry might well be relying on a "transient" type of sale if it doesn't curb the trend toward interruptible sales.

He acknowledged the attractiveness to a pipeline of maintaining its load capacity by off-peak sales, but he noted that recent increases in wellhead prices have changed the current picture somewhat.

He said that by 1960 the gas industry may have priced itself out of competition with coal as a boiler fuel. This was his reasoning:

"If wellhead prices during the next three years continue the rising trend that prevailed in the period 1952 to 1956, they will average 15.5¢ per thousand cu. ft. by 1960. And if the proportion this average price bears to the average cost of boiler fuel is maintained at the 1955 level, the average cost per million Btu. of gas used for electric generation in 1960 will be 26.3¢.

"Yet the average cost per million Btu. of coal for boiler fuel was 25.2¢ in 1955, having declined from a high of 27.3¢ in 1952," Connole said.

"This indicates that if natural gas prices and coal prices continue their relative trends of recent years, natural gas prices will be beyond competing with coal some time before 1960."

While conceding that such "approximations" are not conclusive, Connole argued that, "if producer prices continue to climb, in time all interruptible sales will be in jeopardy."

The commissioner also touched on another phase of the gas picture by pointing out that the recent granting of a 21.4¢ price for offshore gas is not "firm."

He told newsmen that it "does not mean at all" that FPC will use that price as a pattern on other applications.

A new Senior Editor:

Bob Davidson Joins PW Staff

Robert L. (Bob) Davidson, associate editor of Petroleum Processing for the past three years, will join Petroleum Week as a senior editor on Sept. 16. He will concentrate on petroleum processing, including refining, petrochemicals, and natural gasoline.

A native of Missouri, Davidson graduated from the University of Missouri with a B.S. degree in chemical engineering in 1944. After an interval in the army during World War II, he returned to the university to receive his M.S. in chemical engineering, specializing in plant design. He also did postgraduate work at the University of Texas.

Before joining Petroleum processing, Davidson was a process engineer for Arabian American Oil Co., and also was employed by Bermite Powder Co., Aerojet Engineering Corp., and E. I. du Pont de Nemours & Co.

Davidson has prepared a technical book for McGraw-Hill Book Co., on processing plant practices.

He is a member of the American Chemical Society, American Institute of Chemical Engineers, American Rocket Society, and American Assn. of Cost Engineers.

William F. Bland, editor of Petroleum Processing, which will cease publication with its September issue, has been appointed assistant to Harry L. Waddell, publisher of McGraw-Hill's oil publications.

Other members of the Petroleum Processing staff who have accepted positions on other McGraw-Hill publications include:

Willis A. Bussard, associate editor of Purchasing Week.

Alan Corneretto, assistant editor of Product Engineering.

Stuart D. Boynton, assistant editor of Engineering News-Record.

Ronald E. Cannon, who had been southwestern editor of Petroleum Processing, will join the Natural Gasoline Assn. of America on Sept. 23 as staff engineer.

Pure Heads for Rural Site

Many oil firms are pondering whether to stay in the heart of a big—and crowded—city, or to "go rural." Here is Pure's decision, and the problems involved.

Thirty-one years ago this month, Pure Oil Co. moved its offices to Chicago. The reason: to take advantage of the vast facilities a big city had to offer.

The move was not made without some trepidation, for it meant a shift from a "small town" (Columbus, Ohio) environment to big city life in Chicago.

The Pure Oil News, Pure's employee magazine, noted this aspect in an editorial in August, 1926:

"To many who have never lived in a really great city, it is hard to overcome a certain timidity in making the change . . . [but] a great city has its advantages as well as its disadvantages."

But times and conditions change. Today, Pure feels that the disadvantages outweigh the advantages. So it plans to leave the "really great city" and move to the country.

Last year Pure bought a 260-acre site near Palatine, Ill., about 25 mi. northwest of Chicago. It plans to move 1,000 of its 1,200 Chicago office empolyees there in 1960 when its current lease on the Pure Oil Building expires.

The 200 employees remaining comprise the general and executive office staffs. They will occupy about two floors of the present building after the move to Palatine is made.

Robert L. Millgan, Pure's president, has told the employees that the new site was chosen "to provide the best working conditions where the best living conditions exist."

Ground-breaking for the first new building is scheduled for late this year. It will be fully air-conditioned, with lounge, auditorium, and cafeteria areas.

"In general, the design follows the concept of a college campus," says Phillip Wills, Jr., of the firm of Perkins & Wills, engaged by Pure to design the buildings and the landscaping.

The site is close to the route of the North Illinois toll road and to Chicago's new O'Hare airport, making it easily accessible to Chicago and its suburbs, and to long-distance transportation and communication.

A parking lot is being designed for the new site to provide car space for every employee—and with room for expansion when necessary.

Pure is giving a great deal of attention to the problems confronting its employees in the planned move.

First, the company is keeping the employees well informed of developments. A steady flow of employee bulletins have been circulated since the initial announcement last fall.

The employees were told of the work involved, for instance, in getting zoning ordinances changed to allow the company to move to the new site, and of the company-sponsored dinner to which local dignitaries and officials were invited to learn about Pure's plans.

Early this year—three years before the planned moving date—the company began a program to aid its employees in finding new living quarters near Palatine.

J. W. Spence, Pure's assistant secretary-treasurer, was detached from his regular duties to head a program to help employees in relocating.

The aim of the program is to collect and make available to any employee information and consultation with regard to problems apt to confront the moving employee. This includes information on schools, churches, and transportation facilities in the nearby communities, sources of home financing, and review of contracts and other legal documents.

In addition to consultation services, Pure has established a policy for reimbursing employees for all moving expenses.

For renters, the firm will pay the cost of packing, moving, and unpacking. To cover incidental moving expenses, Pure will pay a flat $25, plus $50 a room up to a maximum of $375. For homeowners, the incidental fees are doubled to a maximum of $750.

Pure has some regrets over moving from downtown Chicago, but increasingly crowded conditions there tipped the scales.

When Pure moved to its present location, it leased the 20th through the 23rd floors of what was then called the Jewelers' Building.

It appeared to be an ideal location in 1926, but eventually difficulties cropped up. One of the big problems was space.

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What's New / IN THE INDUSTRY

Texas Gas Demand Grows

A seller's market is developing for natural gas in Texas, even though some 4,000 wells are closed in.

"The picture has changed in just a little while from a purchaser's to a producer's market," according to John S. Cameron, Jr., assistant chief engineer in charge of the Texas Railroad Commission's gas division. "Almost every week, we have one or more calls from prospective gas buyers looking for reserves."

There are about 4,000 gas wells unconnected, but many of them are too isolated to attract buyers. Others are closed in because the producers are unwilling to sell at prices offered. Most new contracts now call for a price of 13¢ or more per thousand cu. ft.

The reluctance of some producers to sell gas to interstate buyers because of Federal Power Commission regulations, and reduced crude allowables, are cited as primary reasons for the tightened gas supply available to large pipeline buyers.

About one-third of the gas produced in Texas comes from oil wells, and the tight crude allowables, particularly during July, August, and September, have reduced the volume of gas.

•

Baltimore Refinery Cut

Esso Standard Oil Co. is discontinuing major refining operations at its 57,500 b/d plant at Baltimore. Future operations will be limited to manufacturing asphalt and greases and blending and packaging lube oils.

All of the major processing units at the refinery will be shut down with the exception of one pipe still of 20,000 b/d capacity, which will be used in the limited manufacturing operations. The shut-down units will be mothballed.

The decision to discontinue making fuels at the refinery was made primarily because of "physical limitations" of the plant site, according to Charles C. Swoope, manager.

The refinery is entirely within the city limits and is surrounded by other industrial plants and residential areas, leaving no room for expansion. Several city streets that cut through the plant complicate placement of units and security and safety precautions.

"The manufacture of fuel products has been uneconomical for some time, despite all efforts by management and employees to revamp operations," says Swoope.

Earlier this year, the refinery, in two lay-offs, reduced the work force from 1,400 to 900.

The future work force will be limited to about 200 employees.

Some older employees will be offered retirement and others will be transferred. But Swoope estimates that about 500 will be laid off.

•

Three U.S. firms plan to drill their first two exploratory tests early next year in Panama under a joint venture on an 870,000-acre concession along the Atlantic Coast.

Champlin Oil & Refining Co. will be the operator, and will hold 50% interest.

Southland Royalty Co. and Kerr-McGee Oil Industries, Inc., hold the other 50%.

Champlin said last week that an option had been exercised on the acreage, following extensive seismic and geological work. The concession is about equally divided between onshore and offshore acreage in the Chiriqui Bay and Almirante Bay areas.

He Picked a Winner

Julius "Dock" Mumford (left), vice-president of Orbit Valve Co., Tulsa, gets topped by Harry Waddell, Petroleum Week publisher, with one of five hats he won in a Petroleum Week circulation growth-forecasting contest. Mumford, on a guess made way back last September, came within one of the Audit Bureau of Circulation's figure of 37,310 paid subscribers for the June 28, 1957, issue.

•

The government may review its product purchases outside the U.S. in view of the import restrictions.

By law, the Military Petroleum Supply Agency is required to buy at the lowest price, regardless of source. There have been complaints, though, that increasing military purchases of foreign products, primarily in the Caribbean, are hurting domestic refiners in a manner similar to the impact of "excessive" crude imports on producers.

MPSA plans to hold its petroleum inventories at lower levels, following the current cutbacks in product purchases. The military forces will be able to operate with lower stocks because of "increased efficiency," according to an MPSA spokesman.

Under its cutback in buying, MPSA plans to "equalize," where possible, its reductions against existing contracts, to prevent serious injury to any one supplier.

•

A meeting on oil storage and stockpiling has been rescheduled in Paris by a working group of OEEC's Oil Committee for Sept. 23-24.

A previously scheduled meeting was canceled when only six of the 17 member countries in the Organization for European Economic Cooperation supplied information on the storage capacity they would have available in case of future crisis.

The Oil Committee already has information on stocks and consumption. With data on storage capacity, it will be able to make recommendations on necessary increases and on more efficient use of present tankage.

Meanwhile, the Oil Committee is meeting to discuss its annual report, now scheduled for publication in mid-October. The committee's examination of last winter's supply situation will have special interest in view of the present situation in Syria.

•

Petrofina has started construction of its new refinery at Duisburg, in West Germany's Ruhr. Its initial capacity will be 20,000 b/d on completion in May, 1959, but will be tripled later to 60,000 b/d.

Output will be 45% heavy fuel oil, 32% light and medium fuel oils and diesel, and 15% gasoline.

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Looking Ahead in Washington

McGraw-Hill
Washington
Bureau

September 13, 1957

The Kefauver subcommittee may give the oil industry a breather. True, the antitrust group is talking about studying the industry's "market leader" pricing system—already under investigation by a U.S. grand jury. It has just hired Horace Flurry, ex-Justice Dept. attorney who launched the grand jury inquiry. And Sen. Alexander Wiley (R., Wis.) is pushing for a study of alleged attempts by natural gas pipelines in the Upper Midwest to keep out Canadian gas. But remember this:

Senate antitrusters are short on time and money. Chairman Estes Kefauver (D., Tenn.) has only $50,000 to last until February. And he is heavily committed to follow through on his investigation of administered—or noncompetitive—pricing. When hearings resume in October, testimony must be heard from the steel, farm machinery, and food industries. Add this to the usual senatorial reluctance to work hard during a recess, and it's unlikely that any real investigation of oil or gas prices will be made this fall.

•

U.S. officials are watching for tips on Argentina's future oil policies. They don't share fears that President Pedro Aramburu's government will be overthrown as a result of its statements that foreign capital is essential to adequate oil development. But they agree that the threat of a coup rules out any chance of Argentina granting concessions to foreign oil companies. At the most, these experts feel, American companies may get a chance to go in on a contractual basis. The first tipoff will come from the constitutional assembly's action on a new natural resources provision.

•

An ex-oilman is setting a precedent for businessmen in government. Democrats on Capitol Hill insist—with few exceptions—that business officials joining the Eisenhower Administration should dispose of stock in firms doing business with the government. But Dr. Paul D. Foote, ex-Gulf official who has been nominated Assistant Defense Secretary, flatly refuses to sell his holdings in Gulf and Standard Oil Co. (Calif.). He says the stock represents too much of his life savings. The Senate Armed Services Committee, which must rule on his nomination next year, is believed ready to let Foote keep his stock.

•

Opponents of the $1 minimum wage have new ammunition against bringing retail gasoline stations under its coverage. The Bureau of Labor statistics has made a study showing that service station employees earn an average of $1.21 per hour. Opponents say the BLS figures show the law isn't needed in the oil business. The same study shows that 25% of service station employees earn less than $1 an hour.

•

One flickering hope for easing natural gas regulation has been dashed. The Federal Power Commission has overruled an examiner's decision that a producer—Continental Oil Co.—selling to a pipeline at the top of the Christmas Tree is not subject to regulation if the buyer owns and controls the valve that regulates the rate of flow. That is, FPC feels that Continental's operation is, in effect, sale at the wellhead and subject to jurisdiction.

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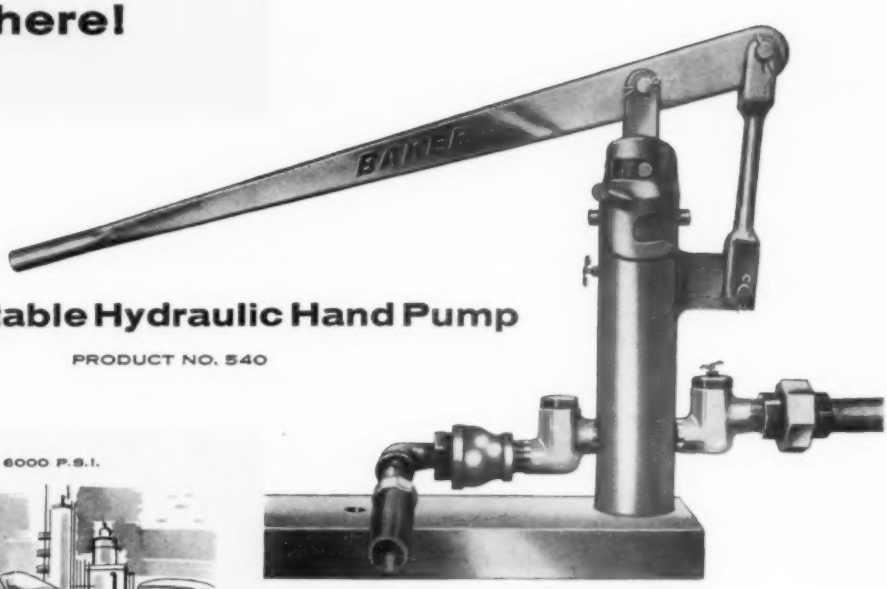

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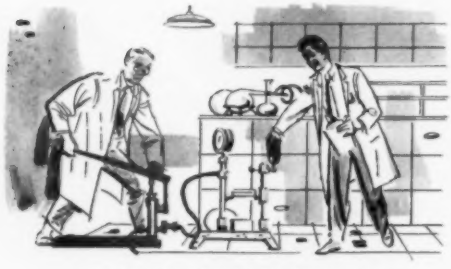

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New Acid Inhibitor Reduces Corrosion

A new acid inhibitor that reduces the corrosion rate of tubing under high pressure and temperature has been developed by Halliburton Oil Well Cementing Co.

Actual makeup of the inhibitor is a trade secret, but Howco says it is a mixture of several liquid organic compounds.

The inhibitor is said to work effectively in giving protection to steel tubing, under simulated well conditions, at temperatures up to 350F and pressures up to 10,000 psi. in tests made in a special autoclave developed by Howco's laboratory.

Howco plans to use the new acid inhibitor exclusively on all wells requiring acidization or mud cleanout.

In acidization, it's best to get the acid slug down the hole and out into the formation as quickly as possible. But it is virtually impossible to eliminate the actual "time of contact" between the acid solution and the steel tubing and/or casing surface. Corrosive action takes place during this period.

One way to prevent this corrosive action is to set up a protective coating between the acid and the steel. Howco says inhibitors offer the best solution to this problem.

Corrosion experts aren't certain yet just what occurs down the hole when the hydrochloric acid—used for acidization, mud cleanout work, and fracturing—contacts the metal tubing or casing. According to Halliburton chemists, the almost universally accepted electrochemical theory of corrosion in aqueous media requires local anodes and cathodes, separated by varying distances. These electrodes cause formation of local "cells" on the surface of the metal.

These almost invisible areas of corrosion, called local cells, are believed to arise from the differences in chemical composition, crystal structure, and the like, of the metal surface. Because an electropotential difference exists between the anode and cathode thus created, a galvanic cell is set up.

Electric current, known as corrosion current, flows from the anode to the cathode via the electrolyte (in this case, usually 15% hydrochloric acid). Under this condition, oxidation or corrosion takes place at the anode (PW—Jul.19'57,p32).

How New Acid Inhibitor Protects Steel Tubing

Before exposure to 15% hydrochloric acid

After exposure, without inhibitor (4 hours at 190F)

After exposure, with Howco inhibitor (4 hours at 250F and 1,000 psi)

The common organic corrosion inhibitors used for the protection of steel against attack by strong mineral acids, says Howco's Dr. Warren Phillips, provide a protective layer to the tubing surface up to about 150F.

This is so, adds Phillips, because these inhibitors contain a polar group which is cationic (positively charged).

"This cationic polar group causes the organic molecule to be adsorbed in a monomolecular layer on the cathode area of the metal surface, diminishing the rate at which the reactants can reach the cathode. The corrosion current is thus decreased, thereby reducing the corrosion rate."

In other words, such inhibitors give a very thin coating to the metal surface, protecting it from the corrosive agents in the acid.

Cationic corrosion inhibitors, such as rosin amine D derivatives, are effective inhibitors in dilute hydrochloric acid media at temperatures up to about 150F.

At high temperatures, however, such as those encountered in the acidization of deep oil wells, these materials apparently lose their effectiveness, says Dr. Phillips.

This loss in efficiency at high temperatures, according to Dr. Phillips, may be attributed to two factors:

- The bond strength of the adsorbed inhibitor on the metal surface decreases as temperature increases.
- Many inhibitors "decompose" in acid media at elevated temperatures.

"Taking these facts into consideration," he says, "a high-temperature inhibitor for use in oil-well acidizing should be composed of compounds that are chemically stable in hot hydrochloric acid solution, and at the same time can be strongly adsorbed on a metal surface."

It is believed that Howco's acid inhibitor leads to formation of a stable chemical compound with the steel surface.

It is this compound that causes a reduction in the rate of corrosion, says Howco.

The new inhibitor first went into field use only a few months ago.

No actual field data on performance of the compound in acidization and mud cleanout jobs, therefore, has yet been released.

Extensive laboratory tests with Howco's autoclave, however, have shown that the inhibitor should give protection under conditions encountered in the field.

Howco officials say the new inhibitor is inexpensive, and in good supply.

One gal. of the specially-mixed compound per 1,000 gal. of acid or mud-cleanout solution is necessary to give the desired protection, according to Howco.

C. E. Clason, coordinator of chemical services for Howco, says:

"This product of our research contains no arsenic or other metals, and is nontoxic. It can be used for domestic water-well treating also."

NO. 1 HARRIS has produced over 2-million bbl. of oil in its 17-year career. The well is in Yazoo County, Miss.

ON PUMP now, the well continues to produce about 170 b/d of oil. It was put on pump about eight months after discovery.

WORKING PUMP forms background for sign marking the "old pro." A larger pump was installed, but other repairs have been few.

Mississippi's 'Old Pro' Still Active

The "old pro" of Mississippi oil wells has pumped its way into a select circle among oil wells—it has produced over 2-million bbl. of oil in its 17-year career.

The well is Union Producing Co. No. 1 Harris, in Yazoo County, which was completed Dec. 23, 1940.

Since No. 1 Harris was completed, it has produced—both flowing and on pump—a total of 2,163,707 bbl. of oil through August of this year.

The well was completed as a flowing well in the Woodruff sand at 4,913-50 ft. On a test it flowed 450 b/d of oil through 16/64-in. choke.

No. 1 Harris flowed 24,067 bbl. of oil before a pumping unit was installed on July 7, 1941, because of a low gas-oil ratio. When first put on pump, the well produced over 500 b/d.

Today, average production amounts to 170 b/d of oil, and 560 b/d of salt water.

With the influx of salt water into the producing sand, bottom hole pressures have increased in step with the increase of salt water, so that total fluid output of the well is now greater than it was initially, although oil production is down.

Union Producing Co. has had no maintenance problems with No. 1 Harris. Says one engineer: "It's one hell of a good ideal routine maintenance well."

There have been no major replacements throughout the well's productive history. Individual rods and individual joints of tubing have been replaced occasionally as required in routine maintenance due to wear and leaks.

No corrosion problem has been noticed in the maintenance of equipment. But the salt water is treated anyhow, as a preventive measure to offset any possible corrosion problems in the surface hookup.

The well has been acidized once—with 500 gal. on Sept. 25, 1943—to clean perforations.

Today, the well looks about the same as it did 17 years ago, with the exception of a larger pumping unit.

Because of the increasing amount of water produced with oil, the original pumping unit was replaced early in 1956. Pumps are changed about every six weeks to three months, or about every 45,000 bbl., for routine maintenance in company shops. They are then put back in operation, either on this well or on other company wells.

The well is in the East Tinsley field,

WORLD'S LARGEST HELICOPTER PLANT in Stratford, Connecticut, together with the large Bridgeport plant, provide Sikorsky Aircraft unmatched production facilities.

First Name in Helicopters

OFFSHORE transportation to oil rigs in the Gulf of Mexico is provided for more than 27,000 men a month by 12-passenger Sikorsky S-58s, as shown above, and by 7-passenger S-55s. The big S-58 can fly 125 miles offshore and return without refueling. Cruising at more than 90 mph, it takes only minutes for trips which would take hours by surface craft.

For nearly 15 years Sikorsky helicopters have been man's most versatile vehicles. Today they are among the most widely-flown, as well, serving the oil industry, airlines, and other commercial or military users on every continent, in 23 nations.

Solid reasons lie behind this wide acceptance. Experience is one. The world's first production helicopter was a Sikorsky, the R-4 of World War II. Since then Sikorsky has maintained unquestioned leadership of the rotary-wing field . . . leadership based on experience, on unmatched research, test and manufacturing facilities, on continuous design, development and production.

Offshore in the Gulf of Mexico, in jungles and other primitive areas, Sikorsky helicopters have a vital part in oil industry activities, saving time and cutting high transport costs wherever they fly. For more information on these versatile aircraft contact Lee S. Johnson, general manager, Sikorsky Aircraft.

SIKORSKY AIRCRAFT

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One of the Divisions of United Aircraft Corporation

one of three separate fields on a faulted dome structure.

The other two segments—the North Tinsley and Tinsley fields—contain more than one producing zone. But the eastern field, in which No. 1 Harris is located, produces primarily from the Woodruff sand, a section broken by shale at the base of the Chalk formation above the Eutaw. The Chalk is comparable to the Monroe chalk, which produces gas in the Monroe field in northeastern Louisiana.

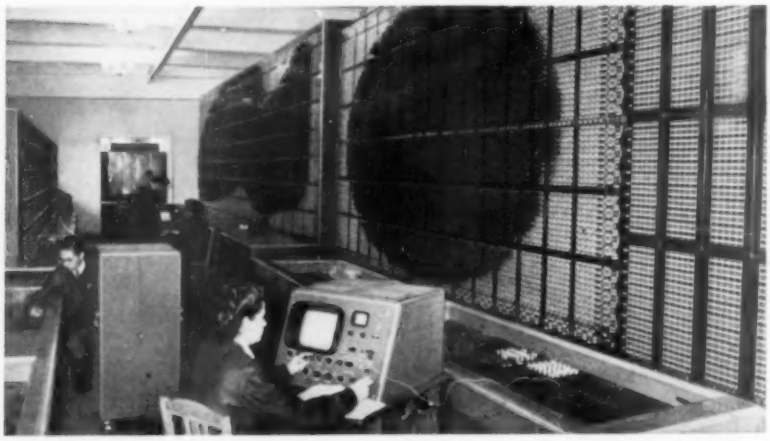
Union discovered oil in the Tinsley field in 1939, to put Mississippi in the ranks of oil-producing states.

In the East Tinsley field, No. 1 Harris is one of six Union wells on the Florence Harris lease. Drilled on 40-acre spacing, the six wells have produced almost 8-million bbl. of oil, with the No. 1 well accounting for over 25% of the total.

The outlook for continued production for both the field and the well are good, says a Union engineer.

Secondary recovery through water flood will not be necessary, he says. Salt water continues to move into the producing sand in a much more efficient manner than could be produced by waterflooding.

The Tinsley field was once considered by Union for conversion to a gas storage field. That was vetoed, however, because of the volume of oil still in place.



ELECTRONIC INTEGRATOR, manned by technicians in Moscow, is said to help . . .

Soviets Seek Oil Electronically

The Russians report they are using an electronic "integrator" to determine characteristics of oil reservoirs.

The report of the electronic integrator was carried in the Aug. 20 issue of "Die Soviet Union Heute" (The Soviet Union Today), a magazine published by the Soviet Embassy in Bonn, West Germany.

According to the magazine, the integrator has been installed in the Soviet Research Institute for Petroleum & Natural Gas, in Moscow.

The integrator operates on the principle that petroleum movements in underground formations are equivalent to those of electrical currents through conductive plates, if the plates are shaped identically to the petroleum-bearing layers.

The integrator uses nets of replaceable resistances, instead of plates, thus reconstructing models of the petroleum layers in the laboratory.

The electronic integrator has about 20,000 intersections, and a special commutation system, which enables the engineers to reproduce the work of 750 drillings at one time, the magazine says.

Reportedly, 30,000 different figures, each corresponding to a characteristic point of the earth layers, can be combined in the integrator.

The machine is said to determine the minimum number of wells to be drilled for optimum drainage of the reservoir. The integrator also is said to determine pressure gradients, the position of pressure bore holes, and the most effective drilling procedure, and to discover subsurface oil-bearing "islands."

The integrator is operated by six to eight engineers. Operations can be watched by electron-ray tubes with a high degree of precision, the magazine reports.

GRIZZLIES are a vanishing breed. So . . .

Alberta Says: Don't Shoot!

The Alberta provincial government has urged the peaceful coexistence of grizzly bears and exploration crews in the Swan Hills area, in an effort to protect the big bears from extinction.

The Swan Hills grizzlies are a vanishing breed of magnificent beasts, which constitute the only known inland grizzly bear type.

The Dept. of Lands & Forests and the Edmonton Zoological Society have expressed concern to the Canadian Petroleum Assn. that the lives of the rare beasts have been placed in jeopardy by the search for oil.

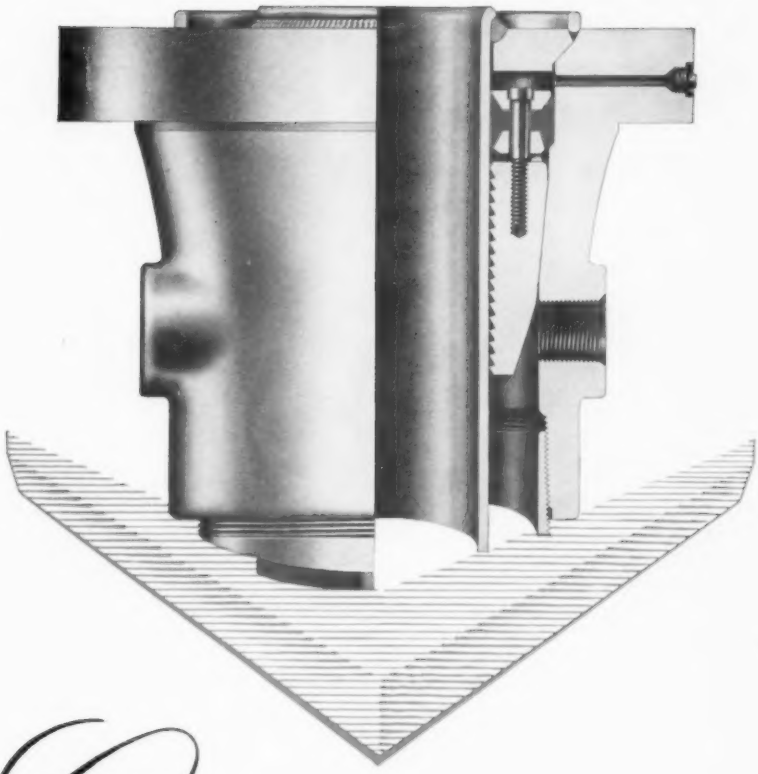
An official of the lands department, in a letter to CPA, said that all bears are protected by law except when they are causing damage to property. He also noted that personnel shooting bears indiscriminately are subject to prosecution.

CPA, agreeing with the lands department, has asked exploration crews not to shoot the bears, and to avoid close contact with them.

In a monthly report to member oil companies, CPA said: "The Swan Hills grizzly territory is being invaded by exploration crews, and there has been some indiscriminate shooting. A most earnest request is being made to our industry personnel in this area to place garbage dumps well away from camps, and thus avoid close contact with the grizzlies.

"They are not known as aggressive animals, being content with thrown-out food, since their contact with humans is scanty. Above all else, crews are urged not to shoot these grizzlies. Cooperation of crews in not molesting the animals will be deeply appreciated by wild-life authorities."

The Grizzlies, second in size only to the Kodiak bears of Alaska, dwell in an area bounded by Lesser Slave Lake on the north, the Athabasca River on the south and east, and the Whitecourt-Valleyview cutoff on the west.



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Union Oil Tries Crestal Drive

An Orange County lease that was the site of California's first waterflood, 13 years ago, is in the news again—this time as the site of the first crestal-drive waterflood attempted in the state.

Union Oil Co. of California is injecting about 6,000 b/d of water in four wells on the Chapman lease, in the 39-year-old Richfield field.

Rate of injection eventually will be increased to 10,000 b/d. At the moment, there are 30 producing wells in the zone surrounding the injection wells. As the flood progresses, some of these wells will be flooded out, and will be changed from production to injection.

Union Oil of California is using crestal-type drive on the Chapman lease because of the irregularity of the oil-water contact and the decreasing thickness of the oil sand from the crest down the flanks. Total area involved in the flood is 143 acres.

The zone being flooded is the upper Chapman zone (Upper Miocene). Structurally, the zone is a faulted, elongated anticline, with the crest near the middle of the Chapman lease. The flood is confined to the Chapman property by structural configuration—a pinchout on the west and a fault on the east.

The dip of the formation in the oil-producing section is from zero to 12 degrees. Reservoir pressure at the start of the flood ranged from 100 to 200 psi. Oil ranges from 15-gravity to 22-gravity, averaging 20-gravity. Average viscosity at a reservoir temperature of 110 F is 40 centipoises.

Maximum thickness of the flood interval at the crest is about 400 gross feet. Within the interval, oil sand thickness is about 250 ft. Approximate well depth is 3,200 ft., and average porosity is 20%.

Though company officials are reluctant to make any predictions, a "good guess" places expected recovery from the crestal flood at about 5-million bbl. of oil.

In addition to the zone that is being flooded, both the lower Chapman and the Kraemer zones are productive on the lease. No additional development is planned for the deeper zones during the course of the waterflood. Present production from the lease is about 1,100 b/d, with output from the three zones commingled. Decline curves have been established for the lower Chapman and Kraemer zones, so that Union can compute production increases from total production on the lease.

A pilot testing and model study preceded the decision for a crestal flood. First waterflood began on a limited scale in March, 1944, when Union wanted to see if water would move heavy oil through the zone. Results indicated that it did.

A pilot flood installed in 1948 led to plans for expanding the flood to the entire lease.

Prior to initiating the new flood, Union set up a model in a laboratory to test flooding by pattern, peripheral type, or by crestal method. Results indicated higher recovery, shorter time for recovery, and fewer wells required for the crestal type.

Capital investment for the flood was $900,000.

This included outlay to drill four new wells, deepen three wells, and reperforate another well; a water treatment plant; and gathering, storage, and injection facilities.

The company estimates a cost of 2¢ for handling each bbl. of water injected. And it figures that it will be necessary to inject about 10 bbl. of water for each bbl. of oil recovered.

The waterflood has been tailored to fit the situation on the Chapman lease. Here's how:

The source of injection water is one of the Chapman wells, which pumps about 3,000 b/d of water and brine. After field-produced water is treated for removal of oil, it is collected in a 5,000-bbl. storage pit. It is chemically treated to control corrosion and bacteria, then filtered to remove suspended solids, through a 400-sq. ft. pressure leaf-type filter.

Next, it is pumped to the injection wells by two high-pressure pumps—horizontal Triplex units with a capacity of 5,000 b/d each at 1,200 psi.—located at the plant site. Pressure on the injection wellheads will be raised to a maximum of 1,200 psi.

All injection lines are cement lined. Plastic-coated lines are used in the water treatment plant. Orifice-type water meters and recorder controllers are used to control injection rates automatically into each injection well.

Another payoff for the waterflood is expected to be in hastening recovery of oil from the Chapman lease. Under primary production methods, the life of the lease is estimated at another 30 years, at the present rate of decline.

Waterflooding may cut the life down to 10 or 15 years—a period over which the wells probably could be expected to hold up in fair condition.

Save thousands of dollars per well in offshore drilling

with LE TOURNEAU mobile platforms

LeTourneau Mobile Platforms are rewriting the cost figures in offshore oil drilling. These completely self-contained units, designed to do the complete job from spudding in to setting production platforms, contribute impressive savings in offshore operations.

The unique tripod design with its electro-mechanical raising and lowering mechanism permits location changes to be made quickly – in a matter of hours instead of days. And since each spud is independently operated, the platform level can be controlled at the flick of a switch in the event scouring or some other unexpected action occurs.

Other safety features are inherent in the design of LeTourneau Platforms. They have more than ample stability when floating and, because of the open-truss spuds, are able to withstand severe weather and wave conditions when elevated. The hull design also permits the units to be towed safely and easily.

The derrick can be shifted both longitudinally and laterally so that more than one hole can be drilled from any location – another cost saving feature. The derrick can also be transferred onto a permanent platform if required.

Whether you're drilling in the Gulf of Mexico, the Persian Gulf, off the coast of Venezuela or any other area, a LeTourneau Mobile Offshore Platform can be custom designed to your particular needs. Let our engineers show you how we can save you thousands of dollars per well. Write or call today.

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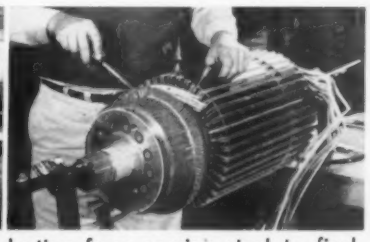

LeTourneau handles the entire production from pouring steel to final rigging. Photos show steel mill operation and electric motor manufacturing in the Longview plant.

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What's New / IN EXPLORATION, DRILLING, PRODUCTION

New Ruling Made On Lease Descriptions

A legal description of land in an advertisement for a mineral lease takes precedence over an ambiguous provision in the lease itself, says Texas Attorney General Will Wilson.

The opinion went to Land Commissioner Earl Rudder, concerning 1,742 acres leased by the state to J. M. Huber Corp. in the Canadian River bed in 1946.

It was discovered recently that field notes of the lease failed to include two pie-shaped tracts that were shown on the sketch accompanying the lease. The sketch follows the description of the tract, which the land commissioner had advertised for lease.

The opinion stated that an erroneous lease can be corrected by the School Land Board. When the lease is made on an "approximate" acreage basis, no additional bonus is required if the tract proves larger than expected, "unless the excess in acreage is unreasonable," said Wilson.

The Attorney General gave no definition of "unreasonable" excess.

•

Suit Charges Conspiracy

Deep South Oil Co. has filed suit in a New York federal court against an insurance company, two gas companies, and five individuals, claiming that they engaged in a conspiracy involving production and sale of natural gas.

The company asks $42.6-million in damages, and that the defendents be enjoined permanently from limiting the amount of gas to be taken from the Big Hill area, in Jefferson County, Texas Gulf Coast.

Named in the suit are Metropolitan Life Insurance Co., Texas Gas Co., Texas Eastern Transmission Corp., and five officials of the companies.

Deep South says it produces and sells natural gas and allied products and operated 28 wells in the Big Hill field.

•

Five Units Approved

Five new units in the Rocky Mountain area have been approved by the U.S. Geological Survey.

Pan American Petroleum Corp. is operator for three of the units: the 12,695-acre Craven Creek Unit, Lincoln County, Wyo., on the west side of the Green River Basin; the Stock Drive Unit, a 12,131-acre block in Washakie County, Wyo., at the southern end of the Big Horn Basin; and the South Douglas Creek Unit, Rio Blanco County, Colo. This 31,316-acre block is just north of the Twin Buttes and Douglas Pass gas fields.

Madera Oil Co. will operate the Elkhead Unit, a 21,750-acre block in Moffat County, Colo. It is 9 mi. northeast of the North Craig field. One wildcat is active on the block.

Sinclair Oil & Gas Co. is operator of the San Arroyo Unit, Grand County, Utah.

•

Falcon Seaboard Drilling Co., Tulsa, says it has established a new drilling speed record in the Carter-Knox deep pool, Stephens County, Okla.

At British American Oil Producing Co. No. 1 Brickel, Falcon crews drilled to 14,785 ft. in 145 days. The test is now drilling below 14,800 ft.

The Carter-Knox pool is the deepest producing pool in Oklahoma.

•

Ohio Oil Co. and Arthur E. Pew have deferred building a mill to extract uranium concentrate from lignite ores in the western part of the Dakotas.

The project will await development of improved methods of ore processing or a greatly increased demand for uranium oxide, says R. W. McCanne, manager of Ohio's Casper (Wyo.) production division.

He says that, "On the basis of the process worked out by Ohio and Pew, building and operating a mill is not economically feasible at the price offered by the Atomic Energy Commission for uranium concentrate produced from lignite."

•

The ten Missouri River Basin states contain more than 59,000 oil and gas wells which have produced about $10.5-billion worth of petroleum to date, according to an official report.

The Interior Missouri Basin Field Committee said that "the value of the 1956 output is reported to have exceeded the billion-dollar level for the first time. Production of petroleum reached 340-million bbl. in 1956."

The basin states include Nebraska, Colorado, Missouri, Montana, Minnesota, South Dakota, North Dakota, Wyoming, Iowa, and Kansas.

•

A comprehensive report on Wyoming oil and gas fields is being prepared by the U.S. Bureau of Mines, and should be completed by October.

The bureau reports that 132 oil and gas field maps have been revised and that 38 new maps have been prepared for the report.

About 9,000 well locations in the state were checked in compilation of the report.

•

The Louisiana Dept. of Conservation held a meeting late this week to discuss methods of gauging and commingling production from offshore leases.

Commissioner John B. Hussey said the meeting was called at the request of the Louisiana Mineral Board, which is concerned about costs and other factors in gauging at individual wells, particularly with respect to royalty payments between state and federal governments.

•

Jett Drilling Co. has acquired leases on farmout form Gulf Oil Corp. in the Citronelle field, Mobile County, Ala.

Under the farmout agreement, Jett will drill 11 tests to the Rodessa formation at about 11,000 ft.

All of the 40-acre units farmed out to Jett offset production in the field.

It is reported that Gulf will take an overriding royalty, and will make no cash contribution to the drilling of the tests.

•

An agreement allowing export of gas from the Medicine Hat area of southeastern Alberta has been signed by Alberta Premier Ernest C. Manning. It gives Saskatchewan Power Corp. permission to remove a total of 223-billion cu. ft. of gas from reserves owned jointly by Crescent Corp., Tulsa, and Britalta Petroleums, Ltd., Calgary.

The permit calls for a buffer zone

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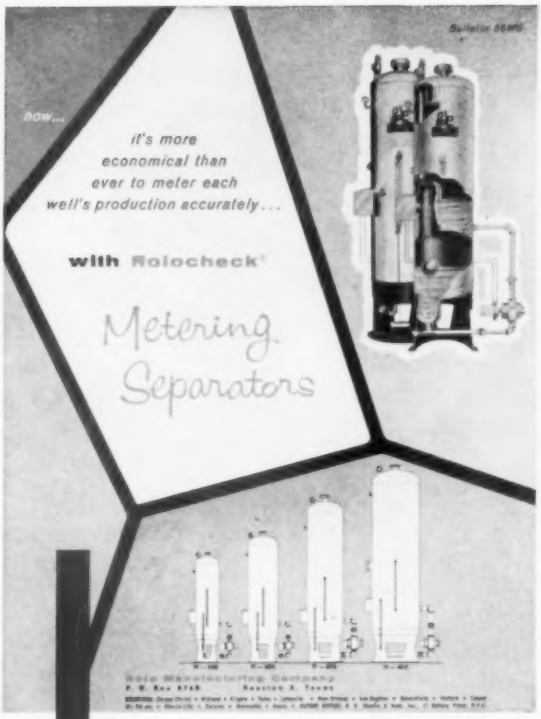

6 page bulletin describes Metering Separators

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For very little more than you'd pay for a separator alone, you get an efficient separator *plus* a genuine Rolocheck Meter complete in one vessel . . . a unit which *separates and meters* the production.

Each unit has the Rolo Neutral Position Three Way Valve which absolutely prevents unmetered fluids from by-passing the meter.

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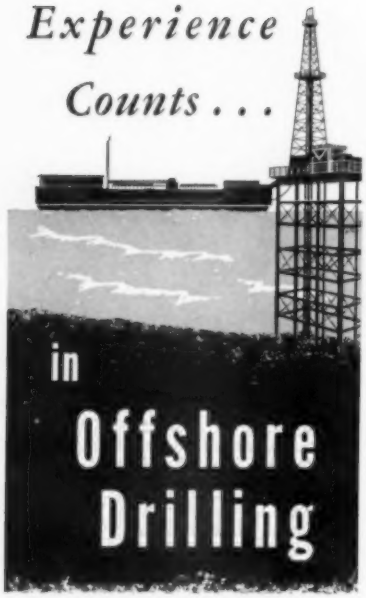

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between the export area and the gas reserves owned by the city of Medicine Hat, due to the migratory nature of the gas.

•

The Montana Oil & Gas Conservation Commission has scheduled a hearing in Helena Sept. 24, to investigate salt-water disposal practices in the East Poplar field, Roosevelt County.

The commission said that "by independent investigation, it had ascertained that the water supply of the town of Poplar is in danger of contamination. Water samples taken from the Poplar River, which flows from the field, indicate a high chloride content."

•

Tekoil Corp. has purchased the holdings of Mountain Valley Oil Co., Denver.

Involved in the acquisition are working interests in 55 producing oil wells and one gas well, plus acreage in Oklahoma, Nebraska, Colorado, Wyoming, and Utah.

Tekoil's president, W. H. Davison, says the new properties will add about 1-million bbl. to the companys' present crude oil reserves.

•

El Paso Natural Gas Products Co., formed in 1955 as a wholly-owned subsidiary of El Paso Natural Gas Co., is assuming responsibility for all production and drilling operations for the parent company.

Oil properties and prospects are now being transferred to the subsidiary firm.

The company also has announced the purchase of 23 gas wells on a 6,200-acre tract in the East Panhandle gas field, in Texas, from Leo J. Portman of Oklahoma City, and associates.

•

Drilling Highlights

West Texas—Pan American Petroleum Corp. No. 2-BZ University, section 5, Block 5, University Lands Survey, Andrews County, recovered 2,024 ft. of oil on drillstem test of the Devonian at 12,721-88 ft. the wildcat is in the old Block 5 field, which produces from the Queen sand at about 4,800 ft.

In Upton County, Delhi-Taylor Oil Corp. No. 1 Champlin University, section 16, Block 4, University Lands, was completed for 200 b/d of 42-gravity oil through 20/64-in. choke from perforations at 9,506-34 ft. The discovery extends Wolfcamp production 2 mi. to the east.

New Mexico—Skelly Oil Co. No. 16-C Jicarilla, section 34-25n-5w, Rio Arriba County, was completed for 192 b/d from the Gallup. The well is 3 mi. west of a discovery completed last year by Amerada Petroleum Corp.

Arkansas—Olin Oil & Gas Corp. No. 1-K Olin fee, section 4-17s-12w, Union County, was completed as a Meakin sand discovery well for the Lick Creek field, pumping 75 b/d of 17.6-gravity oil through perforations at 2,545-52 ft.

Mississippi — Rimrock Tidelands, Inc., No. 1 G. I. Crook, section 33-4n-1e, Wilkinson County, was completed as a McKittrick sand discovery flowing 96 b/d of 36-gravity oil through 6/64-in. choke from perforations at 6,612-16 ft.

Louisiana Offshore—Sinclair Oil & Gas Co. et al No. 3-A OCS-0605, Block 86, South Timbalier area, 23 mi. offshore, flowed at the rate of 481 b/d on 6-hour test through 10/64-in. choke from perforations opposite a Miocene sand at 13,184-94 ft.

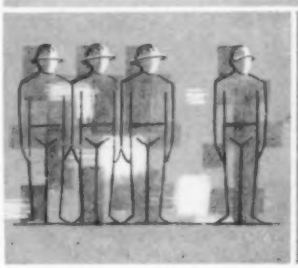
Oklahoma—Cities Service Oil Co. No. 1 Murdock, section 10-4n-15e, Texas County, flowed at the rate of 8,080,000 cu. ft. of gas daily, with a spray of condensate, on 25-minute drillstem test in the Morrow L sand at 6,060-101 ft. Nearest Morrow production is in the Camrick field, 18 mi. to the southeast.

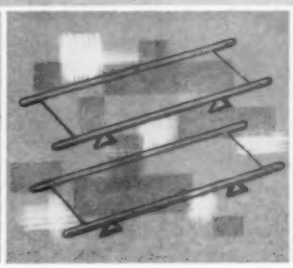
In Cleveland County, Eason Oil & Felmont Oil No. 1 Wilcox, section 35-9n-2w, flowed an estimated 25 bbl. per hour of 42-gravity oil on test of the Second Bromide (Ordovician) at 7,714-29 ft.

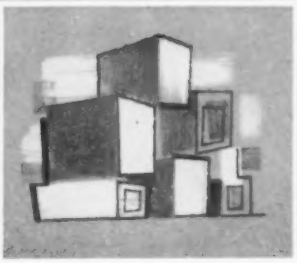
Wyoming—Wyoming Western Oil Co. No. 1 Floy, section 4-15n-61w, Laramie County, was completed as a J sand discovery 10 mi. northwest of Pine Bluffs field. The well was completed for 170 b/d through perforations at 7,625-37 ft.

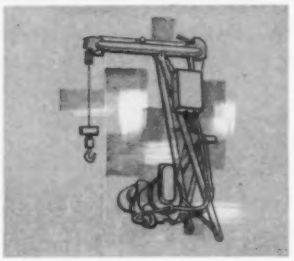
In Park County, Richfield Oil Corp. has spudded in a wildcat at a 10,785-ft. elevation on Carter mountain, 22 mi. south of Cody. This is believed to be the higest test ever drilled in the U.S.

South Louisiana—Salt Dome Producing Co. No. 2 Sun Oil Co., section 6-8s-9w, Calcasieu Parish, measured 2,850 lb. of open-hole gas pressure, with a flow of oil and no water, on test of a sand believed to be the base of the Frio, at 6,700 ft.









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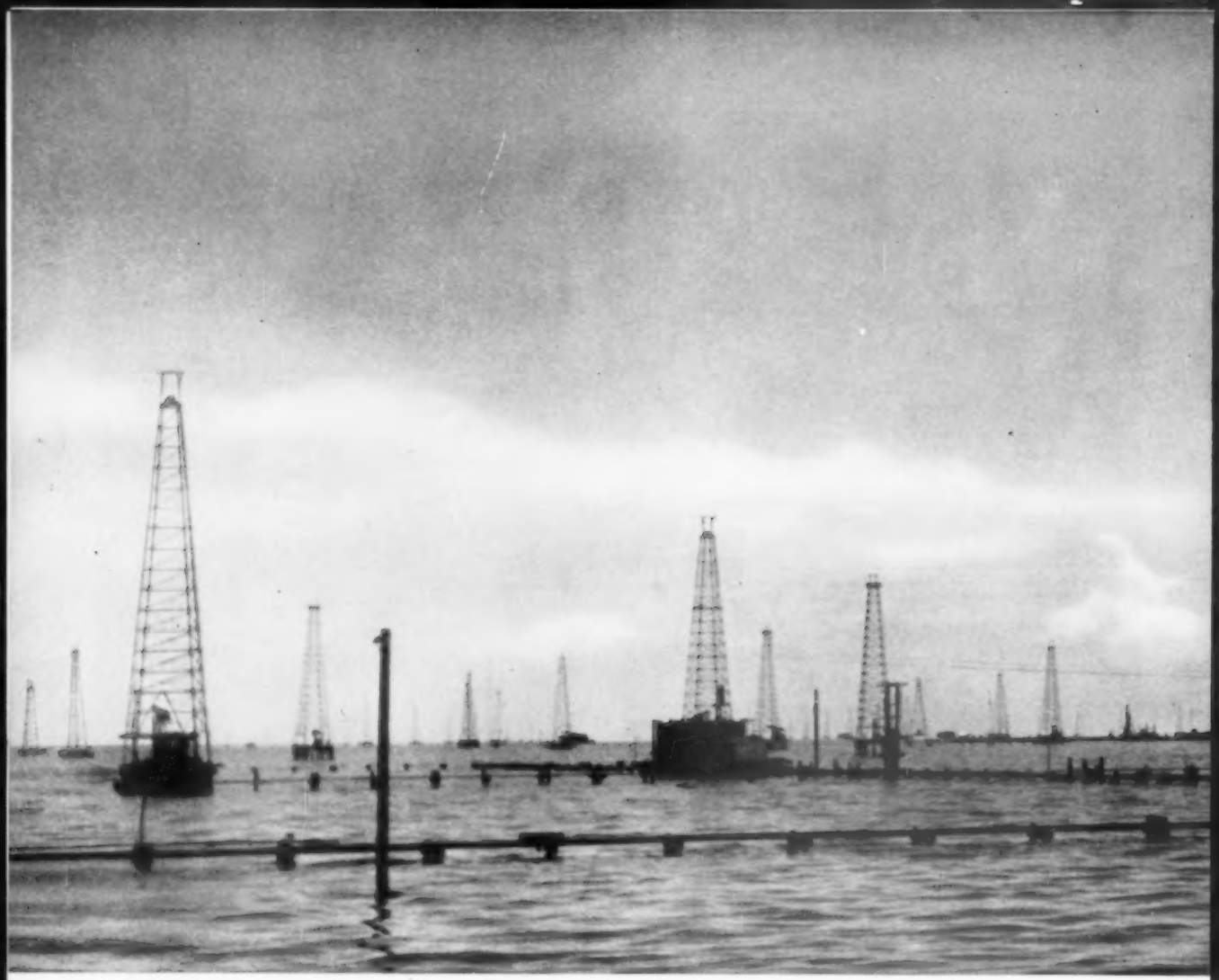
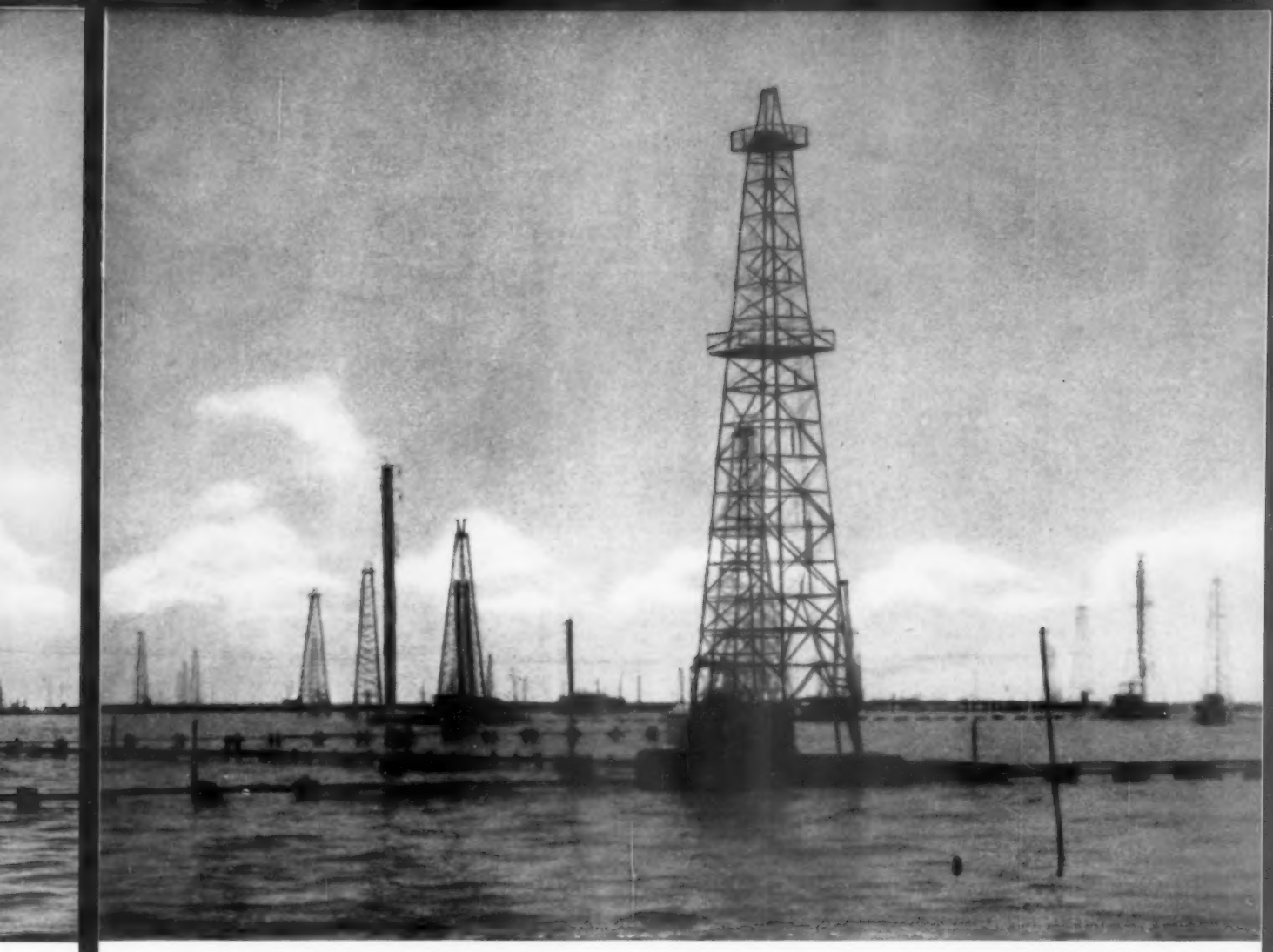


RAYMOND'S important role

Development of Prestressed Concrete Cylinder Piles a boon to oil companies on Lake Maracaibo

LEFT: Giant floating rig in action at job site.

BELOW: Pre-fabricated prestressed concrete cylinder pile en route to platform location.



in the great "Oil Rush" of '57

Not since the days of Spindle Top has the world seen such an oil boom! At Lake Maracaibo, Venezuela, offshore rigs are springing up in amazing numbers, and the swish and thump of pile drivers fill the air. At this impressive, industrious exploration and drilling site, such oil giants as Shell, Mene Grande, Signal, Superior, Sun and San Jacinto have turned to Raymond to provide derrick platform foundations. The reason: Raymond's revolutionary Prestressed Concrete Cylinder Pile. This, the latest foundation development in our 60 year history, assures complete protection against the corrosive properties of Lake Maracaibo. In addition, Raymond Cylinder Piles offer greater structural strength, increased load capacities and longer life. And, thanks to a unique assembly line process, the manufacturing of cylinder piles at the job site saves time and money.

Raymond Cylinder Piles are manufactured in a series of sections placed end-to-end, which are joined by post-tensioned cables of high tensile steel wire. The sections are then grouted to form a homogeneous, impervious support of extraordinary strength and durability. To meet the demands of the new contracts, we are expanding our cylinder pile manufacturing yard, which is located right at the job site. When completed, this yard will be the largest of its type in the world!

For over 50 years, Raymond has served the oil industry, and since 1926, we have maintained a permanent office in Venezuela. You will find Raymond foundations supporting offshore drilling rigs, tanker wharves, cat-crackers and storage tanks just about everywhere oil is drilled and refined. May we also serve you?

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OUR 60th YEAR

DEPT/Transportation & Storage

Pipeliners Weigh Electric Equipment

Electrical control systems for gas-turbine compressors and variable speed fluid drives for electric motors were the talk of a Philadelphia meeting this week.

Pipeliners got new information this week on how best to use the latest in electrical auxiliary equipment for pump stations. It was provided by the American Institute of Electrical Engineers.

AIEE presented the data at its annual Petroleum Industry Conference, held in Philadelphia this week. Experts on electrical equipment for production, refining, and transportation summed up the recent significant developments in each field.

Here are the main points of papers presented for the transportation segment of the industry:

Automatic electrical sequence control systems are now said to be "readily adaptable" to gas-turbine-driven compressors for the remote control of natural gas lines.

Two representatives of Westinghouse Electric Corp., R. A. Yanonne and A. B. Niemoller, and Texas Eastern Transmission Corp.'s F. P. Goertzen teamed up to tell the meeting about "Electrical Control of Gas Turbines in Gas Transmission Service."

The paper made no attempt to sell pipeliners on electrical control systems or remote control of gas pipelines in general. It did contend, however, that "where economics justify remote control of natural gas pipelines, gas-turbine-driven centrifugal compressors are adaptable to automatic sequence control." It described the electrical control set up for gas turbine compressor stations on the Texas Eastern-Penn Jersey pipeline.

At a typical station on the line, the gas turbine power plant, which uses part of the gas being transmitted through the pipelines, is a dual shaft and employs an open type gas cycle with regenerator.

The authors say that the dual shaft provides "increased flexibility over a wide speed range to handle line flow variations."

The electrical control on such a gas turbine can reportedly sequence start-up, operation, and shut-down of the units.

The gas turbine power plant control is basically an electrohydraulic system. Its purpose, according to the paper, "is to control and protect the gas turbine while maintaining the turbine variables of temperature and speed within design limits."

The electrical control is designed to operate on D.C. relaying should there be a momentary failure of A.C. voltage.

The heart of the control circuitry is the "master control relay" operated from the station battery. "The relay," the authors point out, "is suitably interlocked to prevent turbine starting unless required conditions are normal."

The use of variable speed fluid drives on electric motors at pumping stations on products lines also got a boost. It came from F. A. Moore, of Ohio Oil Co.

Moore pointed out that, in order to meet competitive costs of oil products, companies throughout the country are seeking better and more economical means of transporting them. He says that new, fully automatic, and remote-controlled booster stations—which use variable-speed drives between pumps and motors—are helping Ohio Oil to meet these competitive costs.

"Our experience shows," he said, "that large variations in flow are needed in a products pipeline. Varying needs of the shippers, varying line sizes or lengths or terminals, seasonal fluctuations, and extreme differences in specific gravity of the fluid being pumped account for some of these flow variations. It is seldom practical or economical to pump at higher rates than needed and shut the line down for a day or two each week."

Ohio Oil has found, according to Moore, that variable-speed fluid drive is an excellent solution to the control and flexibility problem—while giving savings in power costs over throttling control of up to 25%. Moore said that maintenance costs are also appreciably reduced by the drives.

Pipeliners also got a few new tips for the protection of pipeline station electrical equipment from "transient disturbances."

E. B. Turner, of General Electric Co., said that the proper protection against lightning or power line switching consists in the following:

- Station-type lightning arresters at transmission voltage level for the transformer supplying the station.
- Surge protection on the station bus, consisting of a station-type lightning arrester and surge capacitor in parallel, located a minimum distance from the bus.
- Power supply systems having either dead line check relaying or time deal automatic reclosure.

And a new device for protection of pipeline terminals from static electricity was also introduced.

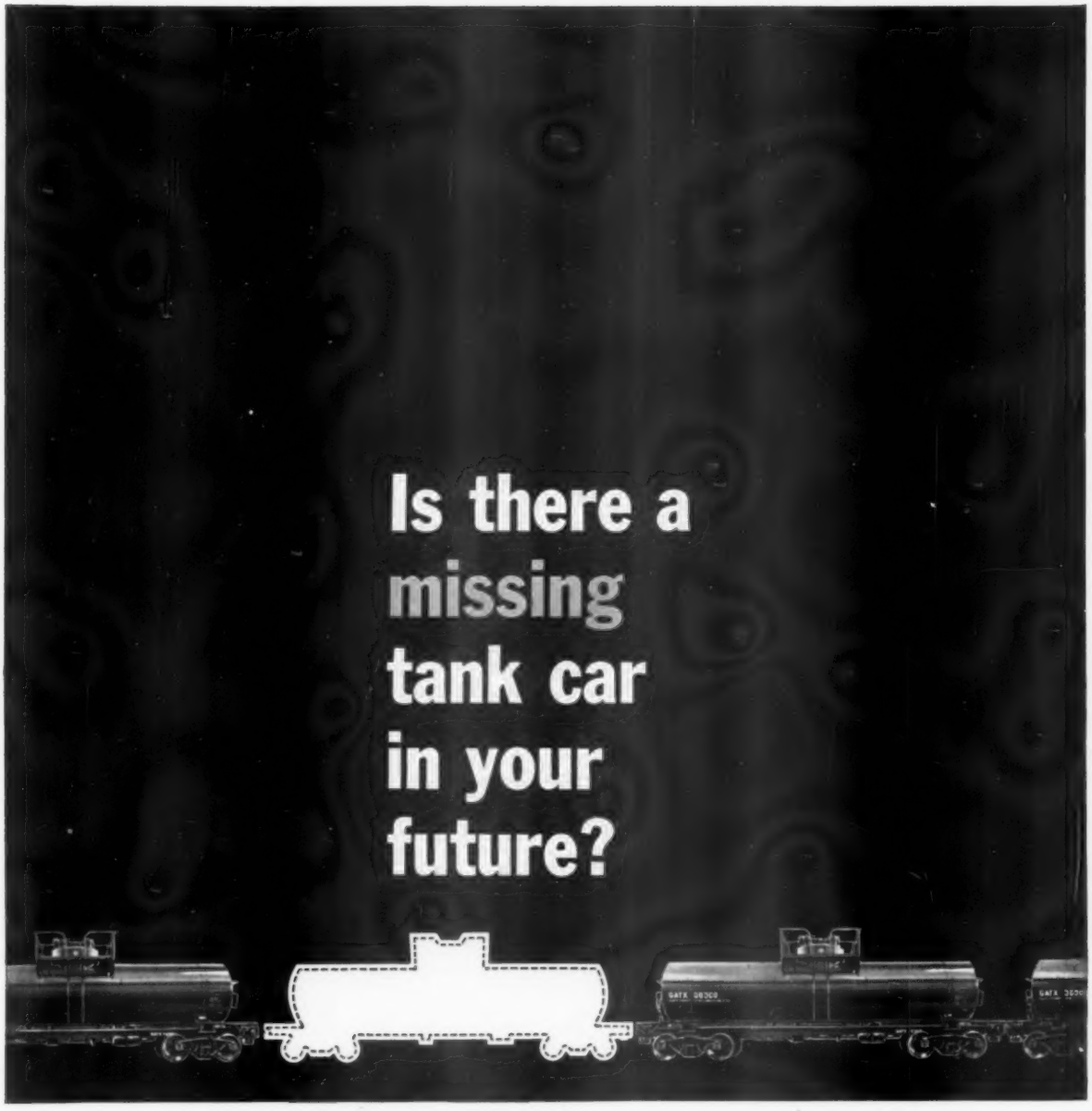
C. H. Scruggs and D. L. Hope, of Great Lakes Pipe Line Co., described the device this way:

"In essence, it is an automatically applied continuity checker connected across the grounding connection and the connection of its own test lead."

Scruggs and Hope said this device overcomes two basic disadvantages of the old "single wire grounding": under the old system, a good mechanical connection does not by any means assure a good electrical connection, and there is no method of measuring the connection.

On to El Paso

This ditching machine, creeping westward on a 274-mi. trek from Odessa to El Paso, is opening the way for the forthcoming 6-in. products line of El Paso Natural Gas Products Co. When completed, the line will move liquid products from the company's Odessa refinery to its storage terminal at El Paso. The line is scheduled for completion in March, 1958. McVean & Barlow Pipe Line Construction Co. is the contractor.



That's almost certain to be the plight of companies who don't plan for their tank car requirements in the decade ahead. It's no secret that available general-purpose tank cars are going to be limited. With normal obsolescence of today's facilities, the continuing steel shortage, and with forecasts pointing to a more than 50% expansion in our economy, *liquid product shipments may be difficult . . . may miss tomorrow's sales opportunities.*

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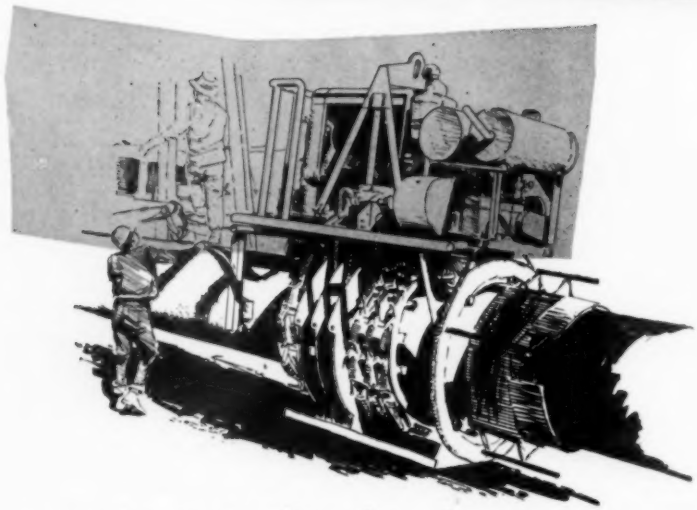

counter-rotating heads assure faster cleaning and priming

Counter-rotating heads prevent pipe from turning and give a better cleaning job. Crose machines are ruggedly built yet light weight—specifically designed for faster, trouble-free service on the line. Crose line traveling machines can also be used with a stationary base for yard work. Crose makes machines for cleaning and priming pipe up to 36".

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New Design for Sinclair Barge

The keel for a specially-designed product-distribution barge—a Sinclair Refining Co. 240-footer—was laid last week.

The barge will be used primarily to carry finished lubes and dry cargo via the Gulf Intracoastal Waterway between Sinclair's Houston refinery and a new oil-canning plant the company is building near Birmingham, Ala. It will be moved by towboat on the 2,000-mi. round trip between refinery and canning plant. It will have no crew.

However, the barge was also designed for use in lake service.

Sinclair may well use the barge to carry products from its East Chicago refinery to distribution terminals on the Great Lakes.

Sinclair has been carrying on coastal product movements mainly in tankers converted from crude service. In 1955, however, the company decided to leave off such conversions and to go to a barge especially designed for such work.

Sinclair's marine department went to work on the design. The result:

The barge was designed primarily to eliminate any possibility of cargo contamination.

The bulk oil cargo space, for instance, will be separate from the hull by means of cofferdams (double skin) on the sides and on the bottom. And this bulk oil space will be divided into 12 separate cargo tanks, each with its own pump and piping system.

Capacity of the barge will be 19,000 bbl. In addition, its deckhouse will carry about 700 tons of dry cargo.

The barge will be 240-ft. long, 48-ft. wide and 15-ft. deep. It will operate on rivers at an 8½-ft. draft.

The barge is being built at the Gibbs Corp. shipyard in Jacksonville, Fla.

Sinclair is already thinking of additional barges of similar design. And use of specially-designed barges for product movement may spread.

Petroleum product barging has followed product demand upward in recent years. (Barge product movements on inland waterways alone totaled 3.8-billion gal. last year, compared with 3.4-billion gal. in 1955.)

If such shipments continue to rise, barging capacity will have to increase to keep pace. So other companies, when having new barges built, may weigh carefully many of the features built into Sinclair's new barge.

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Available at leading suppliers . . . everywhere.

ROCKWELL-
Nordstrom
VALVES

Lubricant Sealed For Positive Shut-Off

What's New / IN TRANSPORTATION

The legal dispute over conversion of the Little Inch pipeline from gas to products service continues. Oral argument in the case will be heard beginning Sept. 23, in the U.S. Court of Appeals for the District of Columbia.

The legality of the recent Federal Power Commission authorization of the conversion is at issue in the court case. Back in June (PW—Jun.28'57, p13), FPC approved an application by Texas Eastern Transmission Co. for conversion of the line—despite loud protests by barge operators. FPC later denied the barge operators a rehearing.

The operators then took the case to court, claiming, among other things, that the FPC conversion order was invalid. Last week the court said that "there is substantial doubt" as to the legality of the order, which was issued without an examiner's intermediate decision. FPC claims the conversion order is "initial license" and does not require an examiner's decision.

A temporary stay of the conversion order was denied by the court, however, on the grounds that the barge operators had not shown injury.

•

Transcontinental Gas Pipe Line Corp. is still awaiting Federal Power Commission approval for construction of additional gas gathering facilities in southern Louisiana.

Transco would like to tie seven southern Louisiana fields into its Texas-to-New York natural gas trunk. It would do so by building a $14-million, two-pronged system, extending from its line in St. Helena Parish.

The supply system would be made up of a 65-mi., 24-in. lateral line extending due south of the Mississippi River, another 24-in. line across St. Helena, Livingston, Ascension, and St. James Parishes, a multiple crossing under the Mississippi, a 22-mi. lateral line south of the river, and smaller lateral lines extending into the seven fields.

Construction is expected to start early next year.

•

Natural Gas Pipeline Co. of America recently completed 20% of its extension line from North Texas through Oklahoma into the Texas Panhandle (PW—Jul.19'57,p54).

The $32-million, 350-mi. line is expected to be completed in November. When finished, it will take natural gas from Jack and Wise Counties, Texas, northward through Oklahoma and then west into the Texas Panhandle, to tie in with the company's main line near Fritch, Tex.

More than half of the system's first section—an 88-mi., 20-in. line from Bridgeport to northern Carter County, Oklahoma—is already finished.

Construction on the rest of the system, which will be about 260-mi. of 26-in. line, is now getting under way.

Contractors for the system are Fulton & Brodie, Inc., Pittsburgh-Des Moines Steel Co., Eastern Pipeline Contractors, H. B. Zackary Co., and River Construction Corp.

Trend Construction Co. recently revised piping at the Fritch and Stinett (Tex.) mainline stations to make way for the new gas supply.

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DEPT/Management

'Talking-Up' More Profit at the Rig

Rocky Mountain contractor fights high costs by discussing them with drilling crews—at company training institutes and in day-to-day conferences in the field.

W. H. CARPENTER pushes training institutes for rig crews, plus . . .

DOGHOUSE CONFERENCES, like this one at a wildcat site in Wyoming.

Can drilling contractors afford to train their crews? They can't afford not to, says W. H. Carpenter, president of Carpenter-Trant Drilling Co., of Denver. He's backing the conviction by taking supervisory training out to his men on the rigs.

Last week the company completed its third "institute" since the first of the year. This was a three-day meeting at Riverton, Wyo., attended by 25 employees—toolpushers, drillers, roughnecks, truckers, and yard men. Subject: teamwork in trucking moves, with a detailed explanation by field superintendent John Anderson of the best way to take down and erect a rig.

Earlier institutes had been held on the basic principles of effective supervision. Each institute is followed up with rig conferences for all of the 60 to 75 men who man the company's equipment.

For Carpenter-Trant, now working in the Wind River and Big Horn Basins of Wyoming, and in the Rangely Field of Colorado, such a training effort is far from an operating "extra."

Last year the company drilled 33 wells, with a footage of 142,229 ft., mostly in Wyoming hard rock. And it continues to share with most other U.S. contractors some equally hard business facts of life.

"We're pushing training," says Carpenter, "because it's getting tougher and tougher to show a profit in contract drilling. Our only hope is to slice into the 55% of the contractor's costs that are in field operating expenses." He observes, "we can't do anything about the other 45%—the fixed charges, such as taxes, depreciation, and overhead. The drilling contractor's success hinges on the crew's efficiency in actual drilling—the time the bit is at the bottom of the well.

"We're stressing the many things men on the rig floor can do to cut costs, or that they fail to do, and thus raise costs. Materials left on the ground, or improperly stored, can be ruined. Hand tools can be either repaired or discarded, depending on the rig crew's attitude. If there is improper lubrication and servicing of the rig, maintenance costs can go way up."

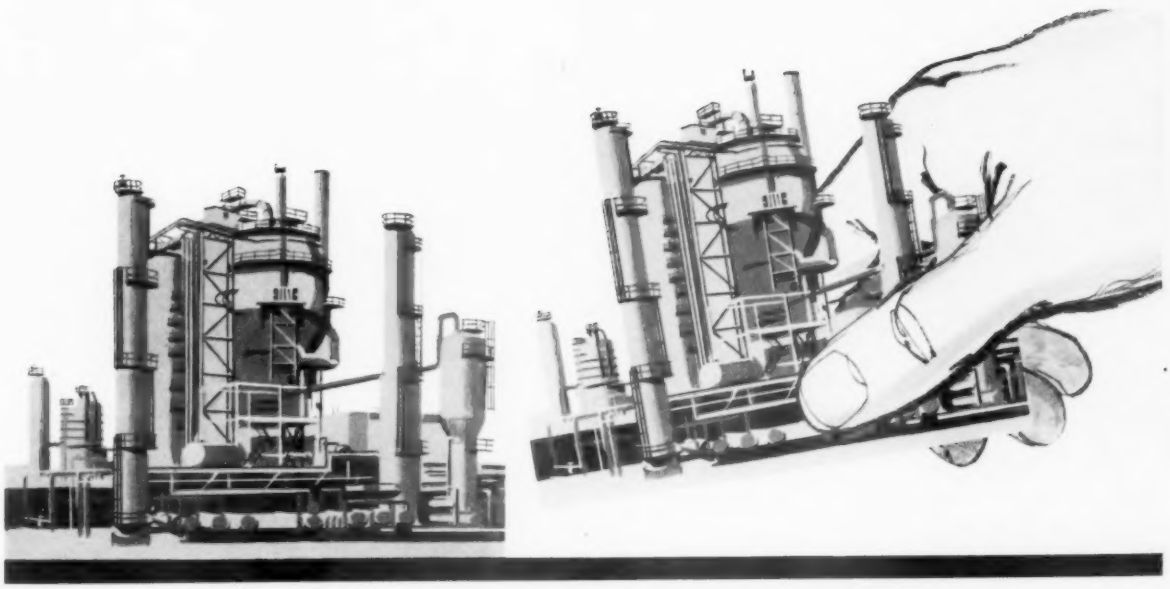
Carpenter-Trant is eyeing greatly reduced employee turnover as a further means of shaving costs. "This won't be easy," says Carpenter, "because of the industry's seven-day week and the fact that drilling is a migrating business. Also, the hourly rate, the fringe benefits, and the safety performance of the rig workers haven't been up to the standards of some other industries.

"And then there is the fact that the average contractor rig is laid down about one-third of the time. If you have to break in a crew every time you put the rig back up, it can cost real money."

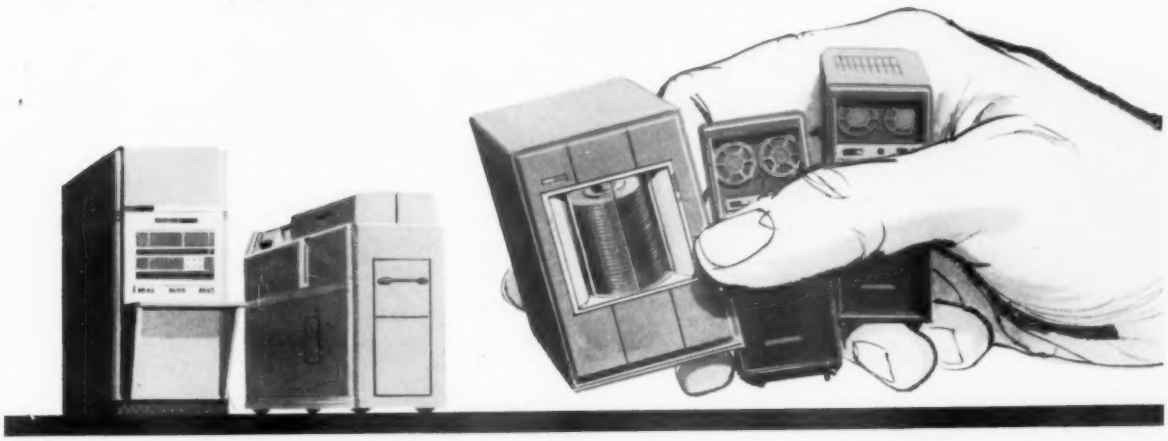
The company feels there is much to be gained by talking over such problems. "We want to get mutual understanding," says Carpenter. "We want to inspire teamwork on the rig. And we want to offer the best jobs, as a means of attracting the best men. It seems to us that the institutes and conferences are a good way of doing it."

The supervisory institutes are an outgrowth of the management training program of the American Assn. of Oilwell Drilling Contractors (PW—Feb.1'57,p35). Both Carpenter and G. E. Mendenhall, company vice-president and treasurer, attended an AAODC conference in Denver last year. They watched M. L. Powers, director of business and industrial services at the University of Oklahoma, conduct discussions on leadership and supervision. They decided that such training fitted their needs, with one change—the men from the rig floor would be the "students." Powers agreed to lead institutes for the company.

The company's institutes are held at locations near the company's operating rigs. Each day there are identical sessions from 10 a.m. to 2 p.m., and from 5 p.m. to 10 p.m. This permits men to attend during hours they are not at work on the rigs. The men get hourly pay for the time they are at the institute, plus



TO KEEP PACE WITH YOUR GROWTH



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". . . we were able to give the rig men a day off a month, with time and one half pay . . ."

TALKING PROFIT starts on p. 40

expenses in driving to the sessions and back.

The first institute, last January, was on the fundamentals of supervision. It laid the groundwork for the company's basic "conference" approach to training. Held at Worland, Wyo., this institute defined the supervisor's multiple duties. Group discussion led by Powers reviewed the skills the supervisor needs in planning, instructing, and coordinating.

The second institute, last May, was on drilling crew leadership. It stressed conferences at the rig as a vital supervisory technique. In "practice conferences," the men discussed such subjects as, "How to keep crews through the spring," and, "How to prevent tong accidents."

Holding such conferences is now a routine practice for Carpenter-Trant crews, to solve operating problems, and to air complaints. Carpenter explains, "Maybe there has been a breakdown, or a fishing job. The men meet in the doghouse at the rig and analyze how it could have been prevented. They decide what to do in the future.

Members of one crew complained that their cars were being torn up on the rough roads to the rig. "The problem was thrashed out," recalls Carpenter, "and the company hired jeeps and trucks to drive the men to and from the rig."

Some of the crew men had been critical of the company's office forms. The criticism subsided when men were told why the forms were needed.

Management also uses the conferences to let men help decide company policy, on such matters as days off. Carpenter calls this "a bigger problem than you might think." He says, "If the truth were known about job terminations on drilling rigs, you'd find that often it is simply that the man is tired. Leaving is the only way he can get a day off. Until this year, some of our rig workers with one year of service had a paid vacation of only one week, and men with two years had a two-week vacation.

"We checked with the men and asked them if they would rather have an increase in hourly pay, or a day off with time and a half pay. They said they would rather have the day off."

Carpenter has also given his crews some confidential information about company finances. "We're in a real competitive situation," he says, "and it's going to be even tougher. If you're expecting to get cooperation from men, you should make them feel they are part of the company. We've told our men exactly what our profit margin is."

The training program is already paying off in terms of lower turnover and faster drilling penetration. Carpenter says that after the first institute there was a 10% improvement in efficiency in one field (where the company drilled 16 wells and could make an exact before-and-after comparison). One toolpusher reported that his job was "one-third easier because the men saw things that needed to be done, and then did them."

"After our second institute," Carpenter adds, "we had to lay down one rig for three weeks. When we put it back up we got back every single one of the 15 men who had been with the rig.

"Most important," Carpenter concludes, "is the change in attitude of the crews. When they voted for the day off, we put it up to them at one of the meetings: 'How are we going to pay for it? By savings in supplies? Fewer breakdowns? More time on bottom drilling and higher penetration speeds?'

"They went to work on all phases. We were able to give the rig men a day off a month, with time and one half pay, with the money they saved for the company."

What's New / IN MANAGEMENT

Conoco Scores High

Continental Oil Co.'s organization is "sound and flexible," say the ten college professors invited to study company operations last month. This was the most frequent opinion given by the educators in their preliminary observations to Conoco management.

Typical of other generally favorable comments:

Prof. Paul E. Holden, Stanford University: "Your decentralized organization is adapted to growth and expansion, although the basic plan was introduced too recently to operate perfectly. I was impressed with the degree of understanding of the plan, and the philosophy behind it.

"You should make increasing use of your management executive committee as a president's cabinet. It should have decreasing day-to-day operating duties, be cut loose from the administrative underbrush, and be working on major policies and long-range plans."

Dr. Douglas McGregor, Massachusetts Institute of Technology: "You have a generally able and enthusiastic management. There is a surprising absence of politicking, personal prejudices, and complacency."

Dr. G. E. Giesecke, Texas Technological College: "Because today's major problems are human problems —not technical—you need to take a hard look at personnel areas where technical backgrounds are not required. Although you have made personnel studies, the company is large enough to inaugurate some new studies, and some sharper evaluation. You may be looking at short-range utility at the expense of long-range value.

Conoco President L. F. McCollum summed up last week, "We didn't get a perfect report, and we didn't expect one."

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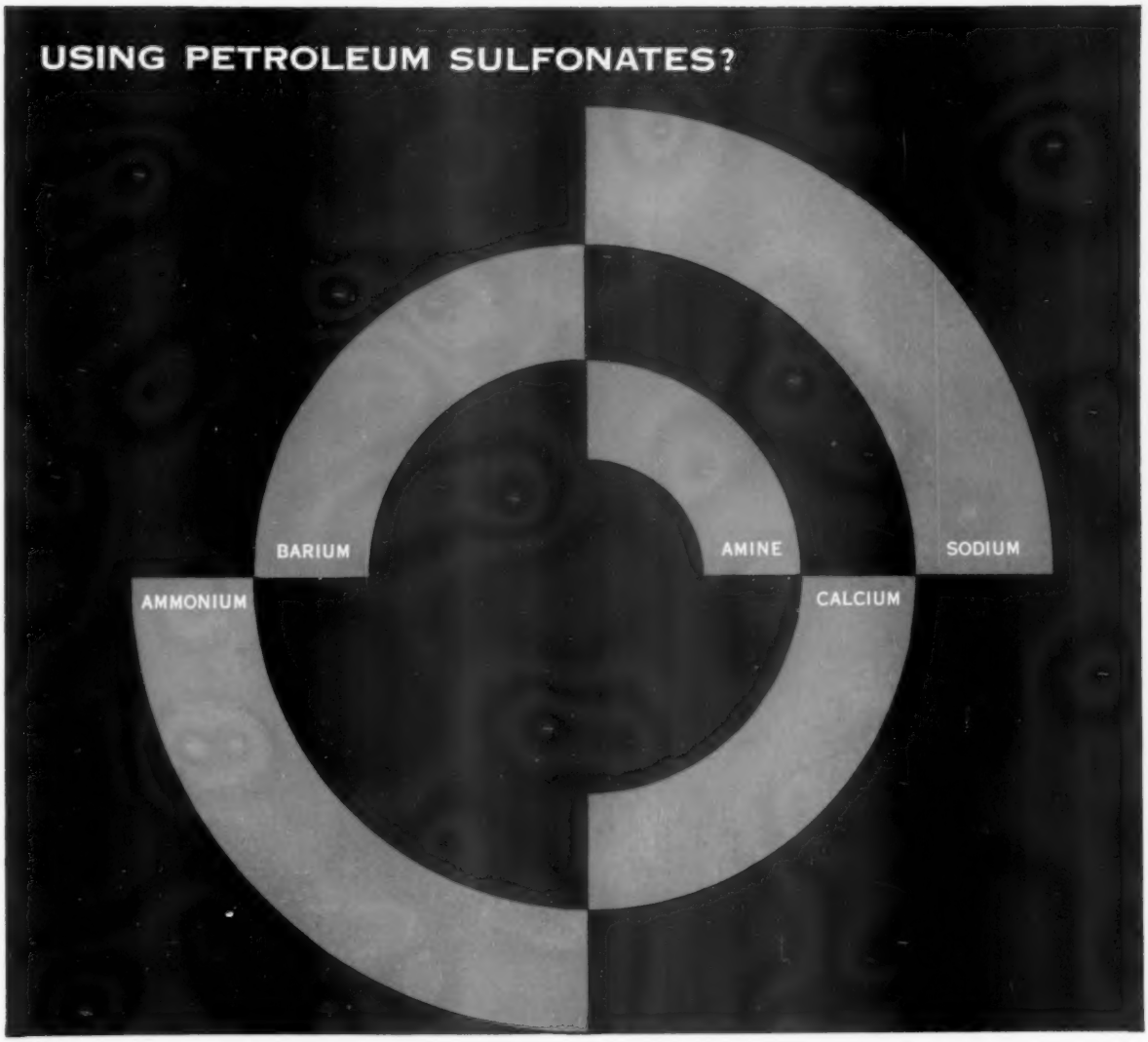
"Get a day's work out of technical trainees," advises the industrial relations chief of a southwestern oil company. "Because competition for manpower is hot," he continues, "you'll lose your share of promising young men.

"If you just hold them for training, you're out the full investment in their careers. But if you make working hands out of them, you can honestly say it's healthy to have more good men on the payroll than you can keep."

•

There will be no loss in benefits for employees transferred to The California Co. in the unitization of the Rangely Field in Colorado next month (PW—Aug.30'57,p19). Calco will give credit for service with other companies in the field. Benefits involved are sickness and injury pay, vacations and holidays, group life insurance, free company life insurance, and a stock plan.



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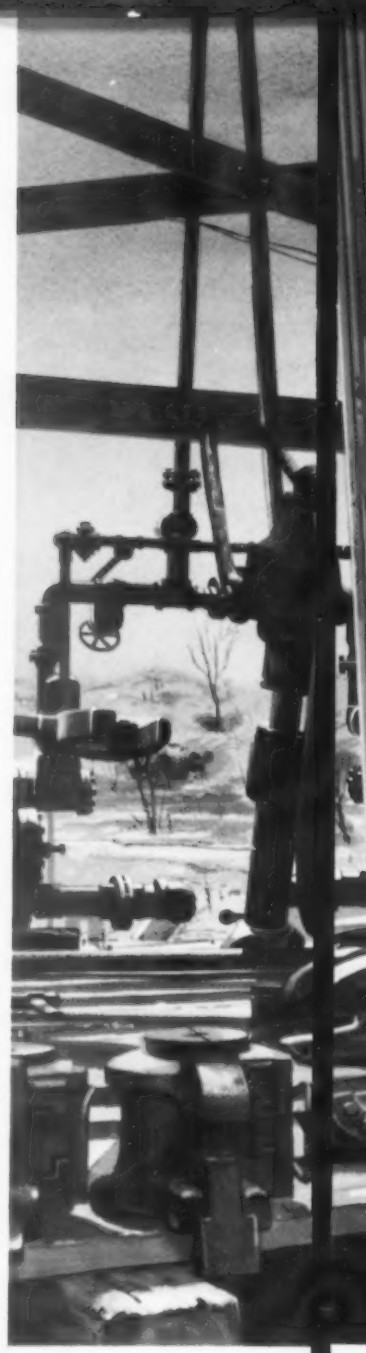

Reed introduced the *first* rotary rock bit equipped with four cutters which rolled on bottom in 1917, and by 1919 this original cross roller bit had set new records for fast and economical drilling in rock. Reed's popular cross roller rock bits were used extensively in the fast development of Gulf Coast fields following World War I.

By 1919 much of the drilling activity was devoted to extending existing fields and developing new commercial horizons within these fields. Some of the fields with extensive drilling operations during this period were West Columbia in Brazoria County, Goosecreek and Humble in Harris County, Barbers Hill in Chambers County, Blue Ridge in Ft. Bend County, and Hull in Liberty County.

Also in 1919, the small but ambitious partnership that had produced the first successful cross roller rock bit became a corporation. From their first plant in a small 30x40-foot rented building on Harrisburg Boulevard, Reed purchased and moved to a 28-acre tract on Navigation Boulevard which is covered today with the most modern oil tool research and manufacturing facilities. Just as Reed cross roller rock bits were synonomous with drilling progress in 1919 . . . Reed Y Bits lead in drilling efficiency *today* with increased penetration rates . . . increased footage per bit . . . and increased dependability.

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The Original Reed Cross Roller Rock Bit

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REED Y BIT

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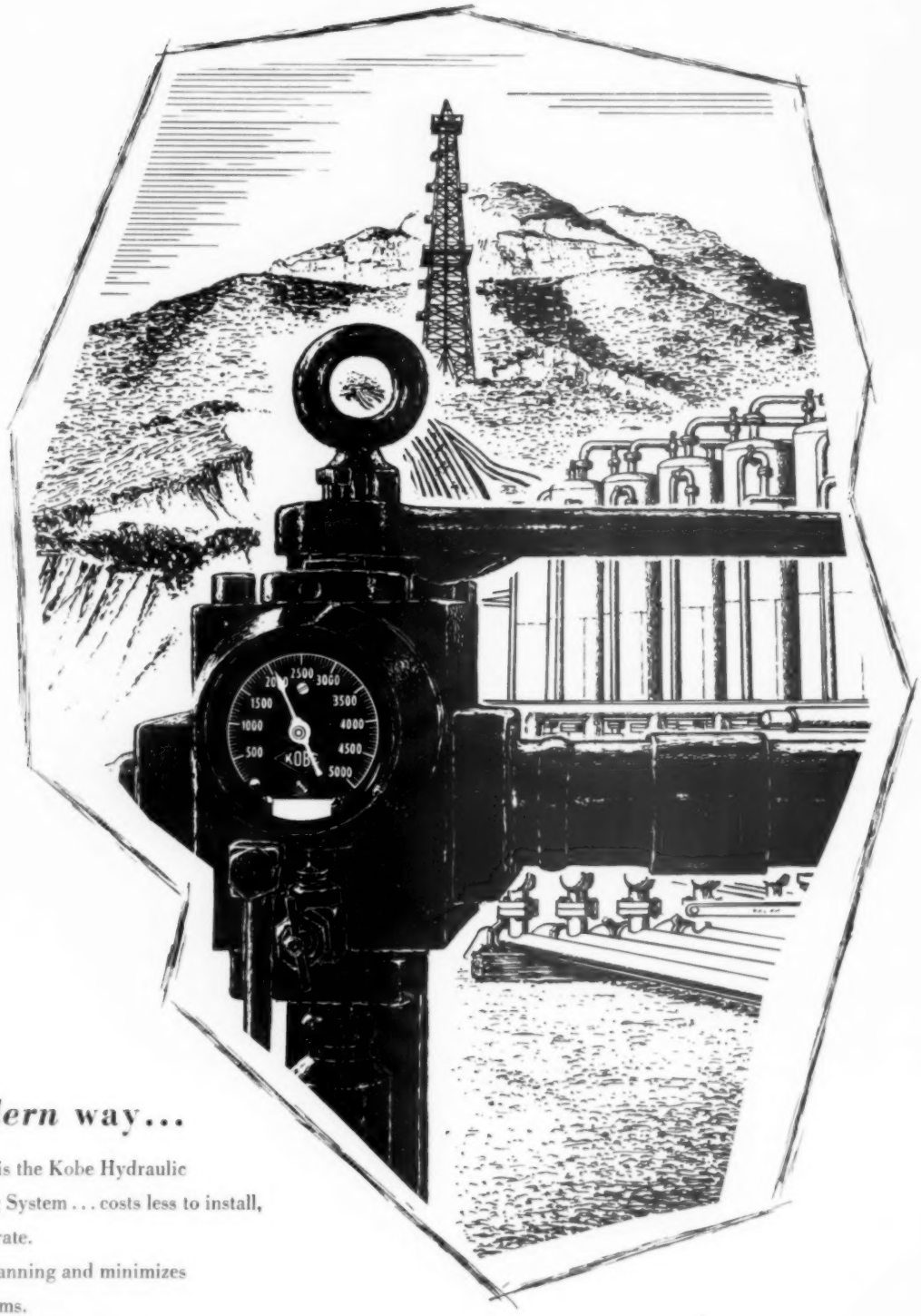
GULF COAST · 1919 Rig floor scene in the Goose-creek, Harris County, field. Note the exposed chain drive to the rotary, single band drawworks and wooden derrick.

REED ROLLER BIT COMPANY

HOUSTON 1, TEXAS



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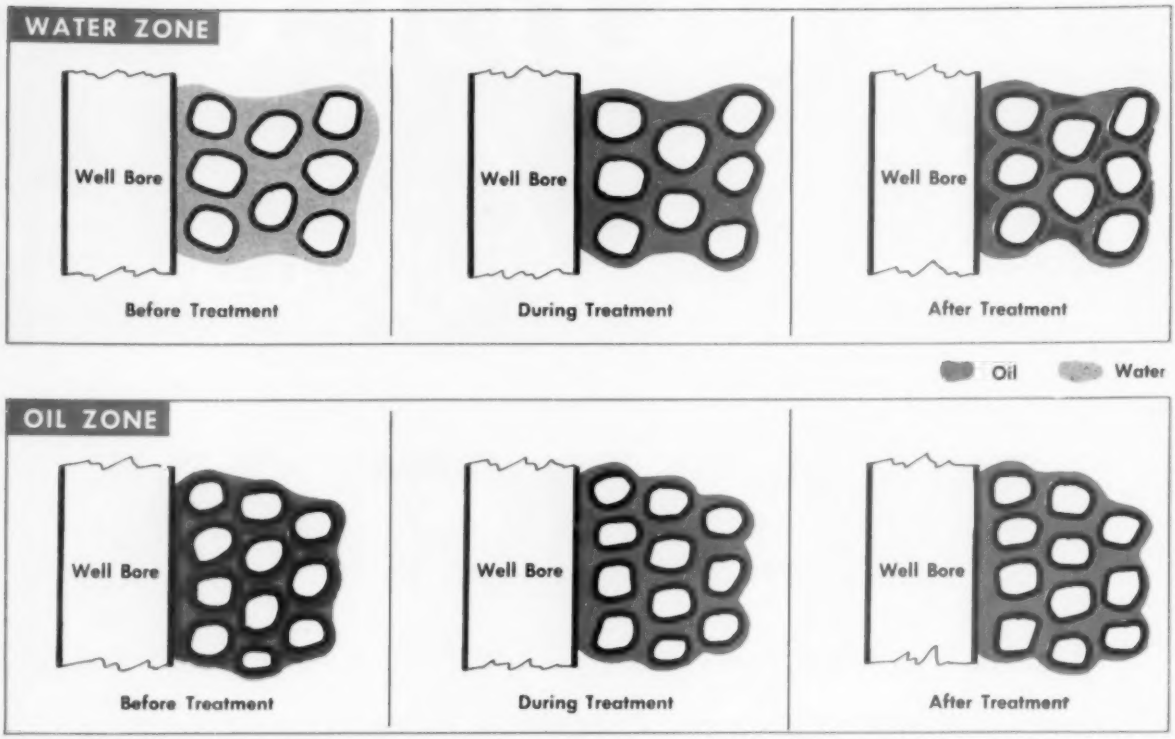
PETROLEUM WEEK / SPECIAL REPORT

PRODUCTION

The big problem: recovering more of the oil already found.

The solution: better use of old methods; increasing use of modern processes; more research to develop new techniques.

Story starts on page 48



SELECTIVE PLUGGING OFF of water production in either water-wet or oil-wet zones is being field-tested by The Western Co. The chemical-crude mixture gels the water, holding it back from the well bore. It's another step toward . . .

Production's Big Goal: Recover More Oil More Cheaply from Known Reserves

The oil industry's production men—beset and bedeviled by a steadily growing number of problems—are pinning their hopes for a brighter future on new, cheaper ways to recover oil.

Oil is getting tougher to find, tougher to produce. Costs of drilling, equipment, and labor continue to spiral, with no apparent end in sight.

The tempo of research in the laboratory and in the field is stepping up, and the results are showing. Much has already been done. But much more is needed.

One development that holds big promise: a chemical method of selectively plugging off water production in oil wells—a major problem in many areas.

The process is now being field-tested by the Western Co., Midland, Tex., which recently introduced a new controlled fracturing method (PW—Aug.2'57,p21).

If it pans out as expected, the method could upgrade stripper-well production and reduce drastically the per-barrel cost of producing crude wherever water encroachment is a factor.

Not only does it cost as much to lift a barrel of water as it does a barrel of crude, but the water presents an added, costly problem—disposal.

Such developments are being given keen attention by production personnel for a possible direct bearing on their generally recognized Problem No. 1—getting more of the oil already found out of the ground at a lower price.

From a top production official of a major company in Texas comes this comment:

"Recovering substantially all of the oil in place is our biggest problem. Things like corrosion control and better completion techniques are important. But they're strictly side issues compared to this job of getting more of our oil out of the ground economically."

From the West Coast comes this view:

"The lack of discoveries in California, plus declining production (923,100 b/d for the week of Aug. 30, as compared with 960,800 b/d for the same week in 1956) have put the pressure on us to get every last drop of oil possible out of proved fields."

An engineer detailed to special production projects by another major company says:

"My company decided a long time ago that we could get twice as much oil for every dollar spent on improved production techniques and secondary recovery as we could get for the same dollar spent on exploration.

From another top production man:

"We can't find enough new oil, so we are spending

more for secondary recovery. We simply have to get more of the oil out of the reservoir, for less money."

And, to accomplish the job, management is tagging huge sums for laboratory research and field programs on just about any kind of project that promises a higher ultimate recovery rate, or less costly operation.

The drive to solve the problem is taking many forms. Some haven't attained practicality yet; others seem very promising.

Here are some highlights of what's being done:

- Virtually all major oil companies, and many smaller ones as well, either have in being, or are planning, some form of miscible gas drive.
- Thermal recovery programs are taking various forms. At least one company may have some long-range plans for fracturing and burning shale underground, producing it as a liquid.
- Carbonated water will get its first commercial try-out soon as a secondary driving medium.
- Laboratory work is still continuing on the possible use of detergent materials to help oil recovery in waterfloods, although prospects don't seem so bright today as they did a short time ago.
- New types of waterfloods, and bigger ones, are being attempted.

Related production aspects, such as the multiple completion of wells, are getting plenty of attention.

- The day of the quadruple completion may be near, accenting the steady acceptance of dual and triple completions.
- Fracturing and perforating techniques are being refined.
- The use of extra-small tubing is increasing, while means of reducing sucker rod wear are being devised.
- A sweeping study by the American Petroleum Institute is under way to find exactly what factors are important in determining reservoir behavior and ultimate reserves.

New: Water Shut-Off Process

The aim is obvious: to achieve better, more efficient recovery and to trim operating costs. That's where such developments as the water shut-off process come in.

Both during primary production in water-drive fields and during waterflood operations, the water enters the oil flow too soon. Frequently, wells wind up producing more water than oil.

The situation is made worse by the fact that the problem continues to grow. For years the industry has been seeking a method to halt such water encroachment without harming the crude production.

Western believes its surfactant (surface-acting) chemical mixture may be the answer.

The chemical mixture, in effect, seals the water in place but allows the oil to flow—perhaps even more freely than before.

Western hasn't divulged the exact chemicals it is using. But the company does say they differ from those used in publicized laboratory experiments which Western helped to finance.

The chemicals are mixed with lease crude for injection.

Actually, Western has developed two processes—it says one is relatively "temporary," the other "permanent." Here's the way the company describes them:

In the "temporary" treatment, the chemical causes the injected crude to wet the reservoir rock. (Whether the reservoir is "oil wet" or "water wet" originally apparently makes no difference.) The oil in the reservoir is "pushed out" of the pore spaces and a continuing oil wetting process is set up (drawing, page 48). But the treatment emulsifies the water attempting to come through, holding it back from the well bore.

For the "permanent" treatment, a somewhat different chemical mixture moves further out into the reservoir and gels the water.

Again, with the water immobilized, the oil continues to flow into the well bore.

If the well is coning—with water moving up around the well bore—the mixture will depress the cone, causing the well to increase its oil production.

The material is mixed in a ratio of 5% chemical to 95% lease crude, although it has been found to work within a range of 2% to 10% chemical content.

Western pumps in the neighborhood of 2,000 gal. of the chemical-crude mixture into the well for each job.

The water-plugging process seems to be showing up well in field testing.

The tests have taken place largely in the Permian Basin area, although Western currently is running tests elsewhere.

In Ward County, Tex., the process was tried out on three San Andres formation wells.

- One, originally making 8 b/d to oil and 100 b/d of water, began producing 20 b/d of oil and 5 b/d of water.
- The second changed from 10 b/d of oil and 160 b/d of water to 30 b/d of oil and 70 b/d of water.
- The third, producing 4 b/d of oil and 73 b/d of water, began making 6 b/d of oil and 4 b/d of water.

A Delaware sand well in Ward County, which had been producing 3 b/d of oil and 100 b/d of water, showed an output of 2 b/d of oil, 90-million cu. ft. per day of gas, and no water.

Remarkable from an academic—if not a commercial—point of view is a Spraberry well which had been producing no oil and 98 b/d of water. No oil production resulted from the treatment, but the water flow was shut off entirely.

No test data is available yet for such formations as the Ellenburger and Devonian.

And there is insufficient information, so far, on how production in the test wells has stood up.

There are certain limitations to the process.

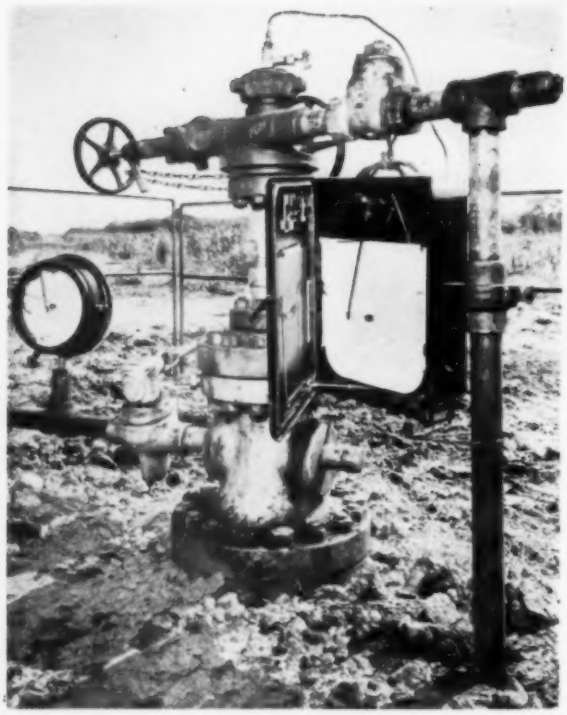
For one thing, Western stresses, the water must be originating in a separate zone from the oil for the treatment to work.

And it says the technique followed in injecting the chemical mixture is as important as the mixture itself.

If the injection rate is too slow, it won't form a front and is ineffective. If it's too fast, the mixure might break through prematurely, disappearing into the more permeable portions of the reservoir without gelling the water.

But, the company believes, when the mixture and technique are properly applied, not only is the water flow retarded, but the oil is provided with more open section, helping to free its movement and increasing the productive rate.

Western has also set its sights on drilling applications, such as the halting of water encroachment during air and gas drilling.



INJECTION WELL used by Conoco at West Short Junction field, near Oklahoma City, is symbolic of trend toward . . .

More Enriched Gas Drives

While the producer is on the lookout for advances such as Western's, the brightest gleam in his eye today is sparked by the possibilities of such secondary recovery methods as enriched gas drives and thermal floods. There are no conclusive reports yet, but enriched gas programs are multiplying fast. The biggest such program proposed up to now is Magnolia Petroleum Co.'s project in the Parks (Pennsylvanian) unit, Midland County, Tex.

The program calls for the injection of more than 1½-million bbl. of propane through 25 injection wells at the rate of 6,000 b/d over a nine-month period, followed by a slug of 16-million cu. ft. of gas daily.

The $3½-million project is expected to increase the ultimate recovery by 100% to 150% above the calculated primary recovery.

About 2,000 b/d of the propane will come from Magnolia's Pegasus natural gasoline plant, some 15 mi. south of the unit, and about 4,000 b/d from the Midkiff area in the Spraberry trend, about 23 mi. to the east.

A company official notes this week that laboratory tests show that a clean sweep of the oil should take place.

"But we don't know that we will get a clean sweep in the field," he adds, pointing out that a good deal depends on such factors as whether the solvent actually will reach all the reservoir pockets.

A top Continental Oil Co. production official observes:

"Theoretically, the enriched gas method is a most efficient recovery process. It shows a lot of promise—if the material (LP-gas) is available cheaply enough and if the subsurface conditions are right."

Conoco started its second such program early in August, in the West Short Junction field, near Oklahoma City, using butane and propane from its plant nearby.

Although the company's first program—in the Meadow Creek field, Wyoming—has been in operation for some time, the company still hasn't enough data for an accurate appraisal of the results.

Among other things, Conoco is experimenting at Meadow Creek with a water slug following the LP-gas.

Cities Service Oil Co. is starting an enriched gas flood in the Hughey "B" Lease, Panhandle field, Gray County, Tex., using butane.

The Texas Co. will begin injecting LP-gas in the Tijerina Zone 3 reservoir of the Tijerina-Canales-Blucher field, Jim Wells County, Tex.

In New Mexico, Sunray Mid-Continent has a program in operation in the Bisti-Lower Gallup pool. British American Producing Co., and Phillips Petroleum Co. are in the program, with Shell Oil Co., Amerada Petroleum Corp., and El Paso Natural Gas Co. supporting it. It utilizes the standard LPG-followed-by-gas method.

The skimpy data on results up to now led one engineer this week to say, wryly:

"Actually, this is a case where 'no news is good news' for a while. It means that we haven't a premature breakthrough yet."

Although it's likely to continue spreading, because the economics seem to be "right"—barring bad field results—the enriched gas technique has its limitations.

One production research director predicts:

"It's going to take anywhere from eight to ten years before anyone will know definitely just how economically feasible these enriched gas drives are going to be."

The production manager of another major says:

"Some people are making a lot of noise about miscible gas drives these days, but it's not a brand new development.

"It is true, however, that just about everybody is going into it now. That's because a lot more gas is being produced now, and LP-gas is becoming a drug on the market. So why not use it for secondary recovery, since it does have a lot of promise.

"We can't find enough new oil, so it becomes economic to use LP-gas to get more of our old oil. But the economics depends on three things: (1) the type of oil in the reservoir; (2) the type of reservoir; and (3) the market for the solvent material."

Spelling out why the process can be applied only "to certain reservoirs," another production man adds:

"There must be certain pressure and temperature conditions present. For example, if the pressure has declined too far, it will take a tremendous volume of something to build the pressure back up to the critical condition—which may or may not be feasible.

"In a case like that, you might have to modify the process by using water.

"All in all, we need a lot more empirical data on how much oil can actually be recovered by this method."

No matter how beautifully such a project might work out in the pilot stage, its success will depend on whether the increased recovery actually tips the scale against the operational costs.

In certain reservoirs in some areas, the enriched-gas process may prove to be "tailor-made."

To West Texas, for example, secondary recovery is some-

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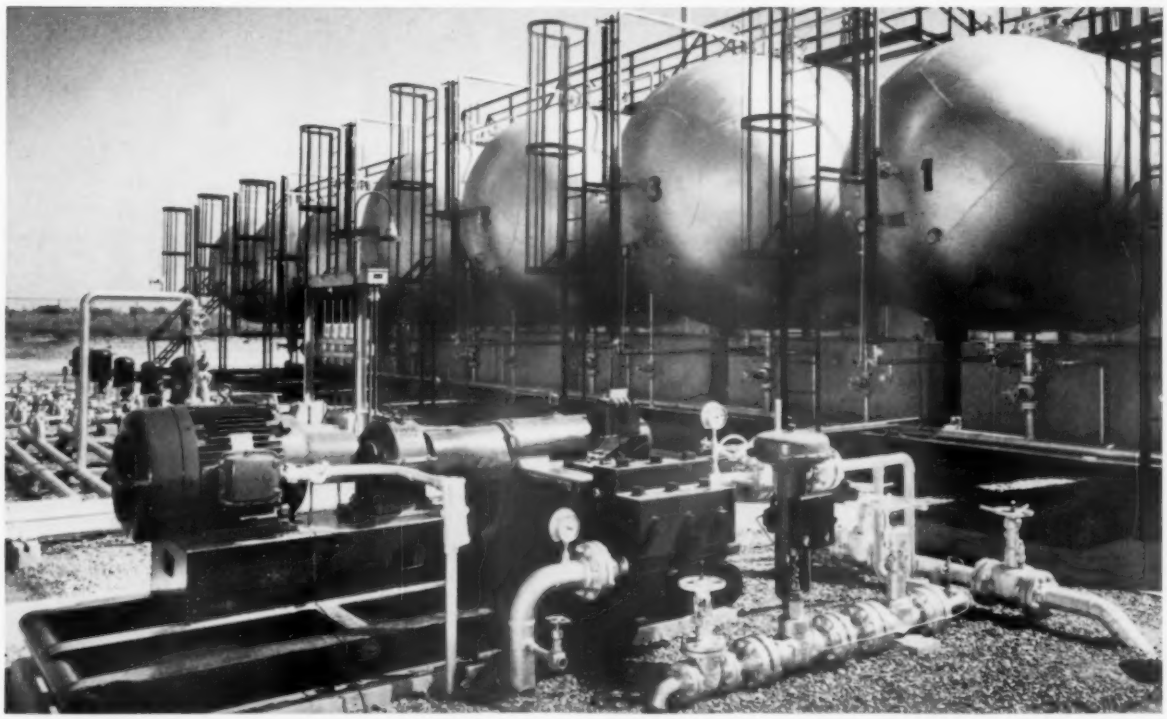


PUMP at Conoco's natural gasoline plant pushes butane and propane to the injection well in West Short Junction field, some distance away. The enriched-gas project started in early August, is Conoco's second of its type.

what of a newcomer. There, water sources for waterflooding aren't over-abundant.

(Magnolia, for instance, is considering the use of 3½-million gal. per day of sewage water from Midland in its 16,000-acre Pegasus field unit, straddling Midland and Upton Counties.)

Generally, West Texas operators foresee a trend toward the enriched gas process for these reasons: (1) They think it will approach a near-100% recovery rate; (2) current demand for LP-gas is low; and (3) the critical water supply in the area makes waterflooding difficult.

Laboratory testing of the principles is still going on. One experiment indicates that injecting propane at the top of a structure might work better than injection from the bottom.

The year-long project was carried out at the University of Houston by graduate students Rainer Vanoni and John S. Brown under the supervision of Dr. Leonard B. Lipson.

Detailed data from the work—involving the injection of propane, propane and a water slug, kerosine, and a lower-viscosity oil—still is being evaluated. But these general conclusions already are apparent:

- When the LPG was injected at the bottom of the structure—apparently because of the density difference between the oil and the propane—the propane broke through too soon, bypassing much of the oil in the simulated reservoir.
- A 100% displacement of the oil occurred when the propane was injected from the top, aided evidently by gravity. There was a higher and more efficient recovery after the breakthrough.
- Results were unfavorable when the propane was chased with a water slug, probably because of the density difference among the liquids involved.

The experiment did not include chasing the propane with dry gas.

For the experiments, a 12-ft core of 40-60-mesh sand, packed in a rubber sleeve and surrounded by casing, was suspended vertically. An overburden pressure of 2,000 psi. was obtained by pumping oil into the sleeve-casing annulus.

The pressure reduced the core's porosity to 34.8%.

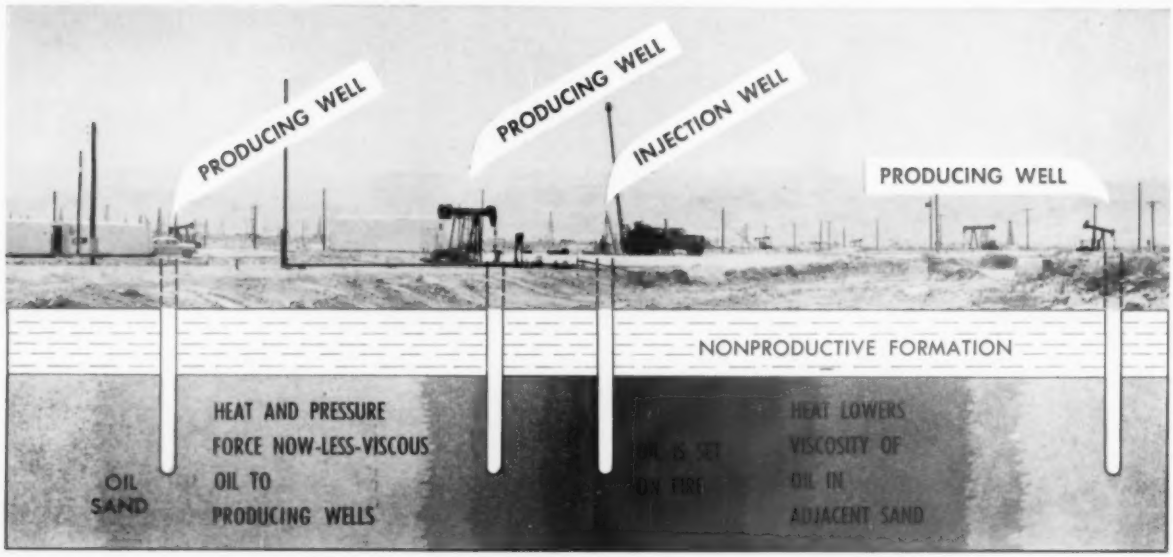
The core was waterflooded to provide a 15% water saturation, and then 12,600 cc. of high-viscosity oil was introduced. The propane was injected at 325 psi., enough to keep it in a liquid state.

The experiment, indicating that the propane functions better when applied on the "gas cap" principle, tends to confirm the opinion of many people concerned with the process. The research director of a major company, for instance, made this comment without knowing of the Houston experiment:

"We feel that the problem of gravity is an important one. For example, propane, in our opinion, would be inclined to move out into a formation at a higher level than perhaps might be needed for treatment, thus cutting down on ultimate recovery."

The carbonated water process will be used in Washington County, Okla. Carbon dioxide from a plant on the lease and water from another formation will be mixed to flood the Bartlesville sand on a 240-acre tract.

The flood, designed as a commercial venture, will be



"FIRE FLOOD" test by Standard of California followed this pattern in the Midway-Sunset field, Kern County. Six wells drilled specifically for the experiment have been abandoned, but laboratory studies of test results are continuing.

operated by Wellsville Oil Co., of Wellsville, N. Y., using the Orco process owned by Oil Recovery Corp.

'Fire Floods' Gain Support

Many operators feel there is more hope—in the long run—for the various types of thermal recovery than for the miscible gas method.

California, with its low-gravity crudes, remains the natural center for field experimentation in "fire floods."

General Petroleum Co.'s Belridge field project, in Kern County, has been under way for some time. Standard Oil Co. of California has one going in the Midway-Sunset field, Kern County, and Richfield Oil Corp. is working on one in the Ojai field, Ventura County.

In Belridge, at least, the underground burn reportedly has spread beyond the original production wells. At least five more producers apparently have been drilled in the experimental area—into the "700-ft. zone," originally containing 13-gravity crude.

Standard of California reported just last week that its thermal recovery experiment in the Midway-Sunset field has moved from the field to the laboratory and computer stage.

The company said the combustion stage, begun July 12, 1956, was discontinued May 8, 1957. While the pattern of the burn was not entirely uniform, the company added, it could not be said that it went off in any wrong direction.

While the field phase has been substantially completed, including the drilling of coreholes, several months are expected to be required for study and analysis of data obtained. The data are being studied with the objective of determinign the future course of the project.

Several other major companies are active in underground combustion programs in the Mid-Continent area.

The results are pretty much under wraps, so far. But some of the projects are understood to have chalked up production increases, indicating the soundness of the principles. Whether the process is economic is another matter.

But the potentiality is expressed this way by one expert:

"In my opinion, underground combustion as a secondary recovery method holds more promise than does condensing gas or miscible gas recovery, because it would seem to us to have more of a broad application.

"Just think what it would mean if we could apply underground combustion processes to the Athabaska tar sands (in Alberta).

"It would be a development of outstanding significance."

Many agree with him, and several variations of this thermal recovery method are being pushed.

One of the interesting thermal programs being considered involves the injection of preheated air.

Houston independents Ray M. Southworth and R. W. Wood are planning a new assault on the tricky Carrizo sand formation of southeastern Anderson County, Tex.

The estimated crude potential of the sand is 1,000 bbl. per acre-foot in the 20- to 60-ft.-thick section centering around the old Camp Hill field, 10 mi. southeast of Palestine.

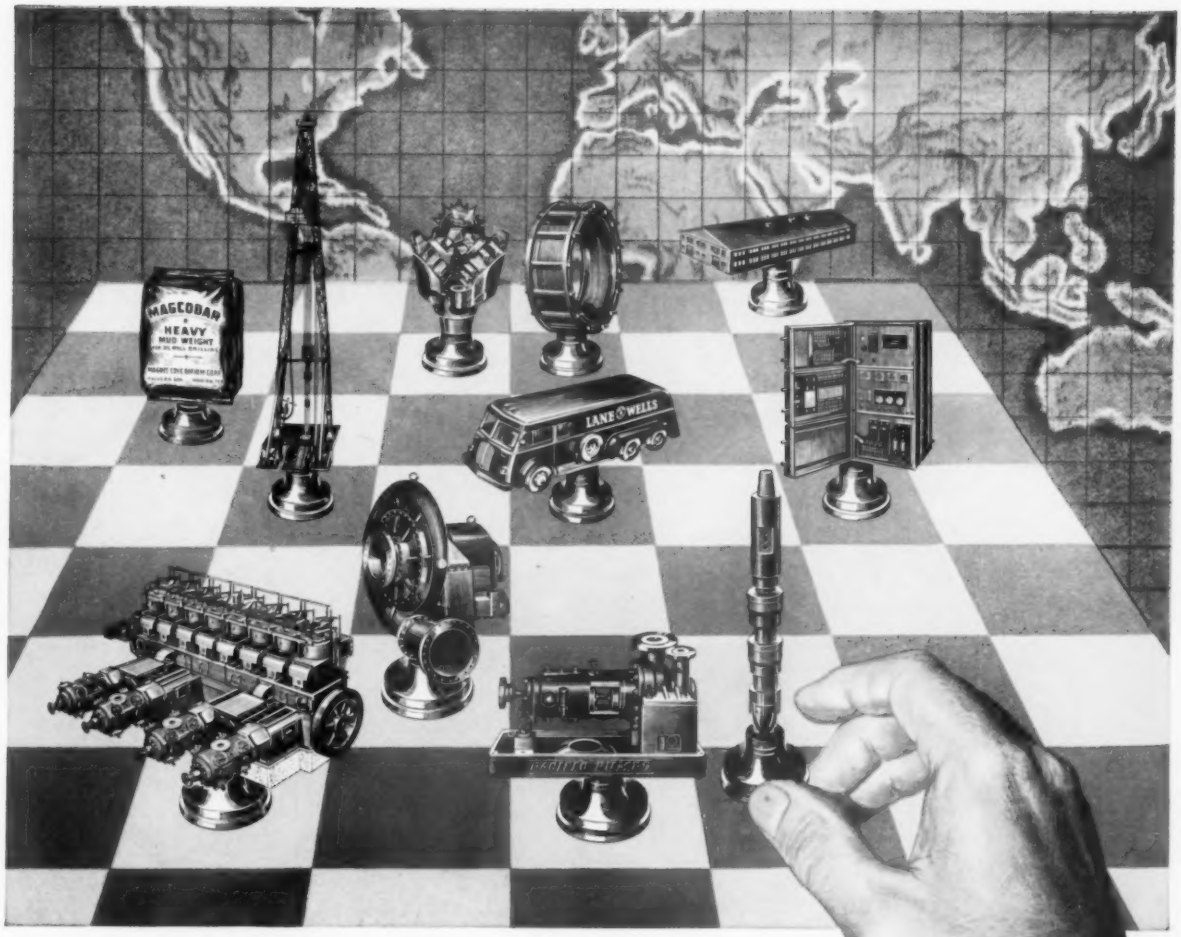
The 18-gravity crude checks out in laboratory tests as 88% lubricating oil, with premium-price possibilities.

Previous production attempts failed because the extremely porous formation tends to sluff off into the well bore, causing the hole to sand up and blocking further fluid movement. The sand particles damage equipment, running up production costs to prohibitive heights. The formation also contains considerable water.

Waterflooding failed, as did a subsequent try at a miscible gas drive by Frank Buttram, Oklahoma City independent, with the loss of the injected butane.

Southworth and Wood reportedly plan to compress and heat air to around 1,000F for injection. Unexplained, at this point, are means for preventing possible excessive corrosion damage to casings from the preheated air.

The hope is that the air will form a cushion on top of



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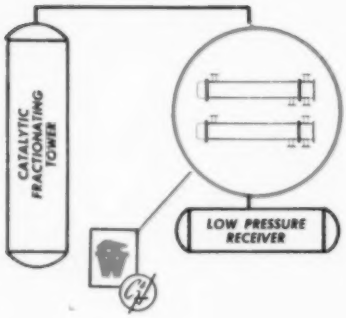

NEW "CAT" FRACTIONATOR OVERHEAD CONDENSERS TUBED WITH WOLVERINE TRUFIN® TYPE S/T CONDENSER TUBE

Because of Wolverine Trufin Type S/T condenser tube, new standards of efficiency and economy are daily being established in the field of heat transfer. Diagramed above is another Trufin installation—this time the condensing, for a large Midwest refinery, of hydrocarbon overhead vapors from a catalytic cracking unit fractionating tower.

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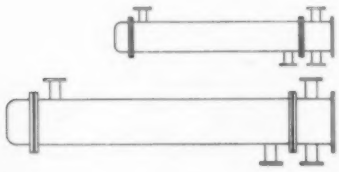
Wolverine Trufin Type S/T will work exactly the same for you as it does for this company. Put it to the test—specify it next time you retube existing equipment or are contemplating the design of new units. Write today for your copy of the Design and Cost Comparison booklet—it's filled with helpful design information.

1

INCREASED EFFICIENCY—Trufin Type S/T is an extended surface tube with its fins an integral part of the tube wall. Because of this, Type S/T has more than two times the heat transfer surface of prime surface tube—extracts more BTU's per foot of tube. Shown here are comparable lengths of tube for equivalent heat transfer surfaces.



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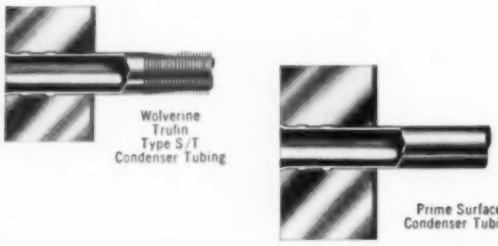
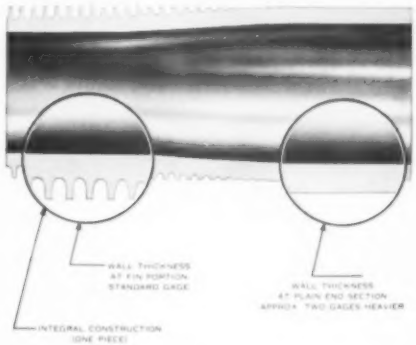
LOWER COST—Type S/T's additional outside surface area permits the use of less tube for a given heat duty. You get smaller shells, baffles, reduce fabricating costs with lower maintenance because there are less tubes to clean.



3

EASY INSTALLATION—Trufin Type S/T rolls into headers as easily as plain tube—uses the same fabrication methods. Standard rolling-in tools are used. There is no deviation from existing fabrication procedures.


WALL THICKNESS AT FIN PORTION STANDARD GAGE
WALL THICKNESS AT PLAIN END SECTION APPROX. TWO GAGES HEAVIER
INTEGRAL CONSTRUCTION (ONE PIECE)

4

ENGINEERED FOR THE JOB—Trufin Type S/T is specifically designed for shell and tube applications. The cutaway photograph illustrates its unique, one-piece construction. Because of this, Type S/T gives constant efficiency—its fins are unaffected by thermal shock, vibration or varying pressures.

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the fresh water in the formation and cause the oil to separate out.

There also is an additional outside possibility of a modified subsurface combustion process being achieved, using the butane presumably trapped in the reservoir.

Old Methods Not Overlooked

But, new methods not withstanding, the old standbys aren't being neglected in secondary recovery. An effort is shaping up to attempt waterflooding a tight West Texas limestone reservoir—something prevailing theory says can't be done successfully.

The proposed flood would be located in the Welch field, northwestern Dawson County, containing some 300 wells producing from the San Andres lime.

If the program is attempted, oil men and engineers will be watching it closely. Limestone fields have been waterflooded in some instances, but they are isolated cases in which edge wells were flooded and the producing zone had fairly good porosity, at least.

The Welch limestone flood, however, will be the first major example of its kind in West Texas.

Cities Service Oil Co. has slightly more than 50% of the wells in the field. Other companies involved are Anderson-Prichard Oil Corp., Brinson Collins Oil Co., Cascade Petroleum Co., Childress Royalty Co., Hunt Oil Co., Kerr McGee Oil Industries, Kay Kimbell, Magnolia, Milestone Drilling Co., Montex Oil Co., Plymouth Oil Co., Pure Oil Co., Richmond Oil Co., Tidewater, and Western Drilling Co.

Recalling that a pilot four-well waterflood, begun in the field in June, 1955, had shown "good results," a representative of one of the companies says:

"It's been a fairly well-accepted theory that tight limestone formations, such as in Welch, can't be successfully waterflooded. That theory is really without much basis, and this could be a proving point.

"What it means is this: If the Welch project proves successful—and there's every evidence it will—then virtually all the limestone reservoirs in the Permian Basin will eventually be waterflooded."

An engineering committee is winding up a three-month study of the program, and a unitization agreement is being worked out. Water for the flood will come from wells to be drilled in the field into the Santa Rosa formation, believed to contain an abundant supply of brine.

Union Oil Co. of California plans to try an unusual type of waterflood on the West Coast.

The company will flood a 143-acre lease in the Richfield field, Orange County. It will inject salt water through four wells into the highest and thickest part of the reservoir, a variation from the down-dip method of flooding.

Multiple Completions Grow

The quadruple well completion appears near—emphasizing the galloping pace being set in multiple completions.

In the last stages of machining at McEvoy Co., in Houston, is a huge wellhead valve specially designed for completing four zones in one well.

The 1 13/16-in. ID quadruple valve, with four integral Ts, is designed for service with 2 1/16-in. OD tubing (1¾-in. ID).

HUGE WELLHEAD valve, in the last stages of machining at McEvoy Co., is designed to complete four zones in one well.

Its 10-in. flange will withstand 5,000 psi. working pressure, along with the 2-in. flange on each T.

McEvoy's biggest problem in designing the equipment was to match the OD of the casing size contemplated (8⅝ in.), to leave enough wall space for 10,000 psi. test pressure for each of the four tubing strings—and yet to wind up with a piece of equipment that could be cast.

Another design problem was the spacing of the handwheels for the four wing valves and four master valves.

Just when and where the equipment will be put into service hasn't been decided.

There is no question that there will be a constant increase in the number of multiple completions, despite a certain amount of hesitancy.

One equipment company has had three shifts working steadily for the past three years to keep up with demand for multiple-completion equipment.

Another estimates that it has participated in more than 2,000 such jobs and sees no slack-off in the near future.

"Management is demanding it, and we certainly are going to do what management says," one production manager reports. "If you can complete one well in two zones for 1½ times the cost of completing a single-zone—instead of doubling the cost by drilling a second well—it makes economic sense."

Some production men, however, feel that workover costs down the road may eat away this apparent saving. They point out that a multiple completion, particularly in 5½-in. casing, leaves little working room for any later remedial steps.

"Sure, you can complete five zones in a well, providing you use small enough tubing," observes one. "We're having no trouble at all completing and producing our multiple wells. But I pity my successor. He'll have a fine time working over some of them when they sand up or he gets some leaks in them."

But most production men report no major troubles with multiple completions. The answer to possible future troubles, of course, lies in better engineered equipment and tools—both of which are sure to come.

Progress on Other Fronts

Aside from the secondary recovery theme, most absorbing to the production man are the newer and better mechanical productive practices, such as automatic lease operation, leading to automatic custody transfer.

"It's a lead-pipe cinch that lease automation, together with automatic custody transfer, will expand swiftly over the next few years," comments one production research chief.

This same type of statement, made repeatedly by production people, bears out PETROLEUM WEEK's recent findings (PW—Jul.26'57,p21).

Here the big job is the further improvement of instrumentation—for instance, the development of an absolutely "fail-proof" bs&w monitor.

The trend to lease automation has set in so strongly, however, that service, supply, and equipment companies are having to hop to meet increasing demands from operators.

On another production front, an Atlantic Refining Co. experience points to the desirability of using relatively large amounts of radioactive material as a better way of finding casing leaks.

Last February, Atlantic was having reservoir pressure trouble in a gas injection project, and gas was being lost. By using radioactive material, the company was able to detect the trouble area.

While the technique has been used successfully before, Atlantic feels that its method gave better-than-average results. For one thing, the carefully planned size of the slug was unusually large. And, by running follow-up tests, Atlantic found there actually were two leaks in the wall.

The company feels the experience is a valuable lesson for application later, when it begins a miscible gas injection program. The engineers believe a careful preoperative radioactive tracing of injection wells could save considerable amounts of LP-gas.

By taking a long look back, it may be possible to make some much more accurate forecasts of reservoir behavior and reserves estimates. An API subcommittee has just launched a new computing-machine study in an effort to do just that.

Described as "potentially, the most important development in the field of reservoir engineering in a long time," the study is being conducted by the API Subcommittee on Reservoir Efficiency, Division of Production.

The group is now distributing a questionnaire among companies in an effort to collect a vast storehouse of raw data.

This information will be fed into computing machines to build up conclusions. By finding out how particular types of reservoirs actually do act—instead of how they "should" act, according to present theories—the group may be able to evaluate the information which can best be used to forecast reserves and reservoir behavior.

In other words, the study may pin down definitely the relation of certain factors or combinations of them to actual ultimate recovery.

The study may wind up demonstrating that operating companies presently are spending large sums of money collecting some items of information which actually have no bearing on ultimate recovery.

The new study will go much further than a previous one—conducted in the 1940s on some 100 fields—and, by the use of the machines, possibly will result in more definitive data.

Tubing has shrunk to tiny sizes, due largely to the special needs of multiple completions. Called by some one of the most important production developments in years, use of the smaller tubing has jumped tremendously.

The 2-1/16-in. OD size is one of the more popular, since two strings will fit inside 5½-in. casing. This is about as small as tubing can get right now in a pumping well. And in high-pressure gas wells, it is becoming a common occurrence for operators to run 2-in. OD tubing inside 2⅞-in. tubing, filling the annulus with inhibitor.

Even tubing as small as 1-in. OD is being used, for special purposes.

Actually, the shrinkage in tubing size came so suddenly that it was necessary to re-engineer wellhead equipment almost overnight to accommodate it.

Fracturing and perforating—now fully accepted as valuable production aids—are still under scrutiny. The reason: Operators are seeking improvements.

A production executive of one major company says bluntly: "Fracturing is still in the evaluation stage."

A production laboratory head adds:

"The recovery from low-permeability reservoirs will reach its ultimate value when we learn to fracture at predetermined levels and learn how to keep the fractures open better."

A production superintendent says:

"We don't have enough information yet to decide how many perforations you really need in a given zone. It may well be that, with sufficient experience, we'll be able to narrow it down to one set of perforations in one part of the zone."

A research laboratory head in Oklahoma adds:

"The big thing in the future in fracturing will be in the accurate and exact placement of the fractures and the determination of the right size or type of fracture in individual wells."

One major company is actively testing this procedure in Oklahoma. It is perforating only a small portion of the pay zone, usually 1 ft. in sand and perhaps 4 ft. in limestone. Presumably, the operator is fracturing through this small perforated zone.

A company superintendent calls the procedure "frankly, an experiment." He says: "It's too early to say whether we have something, or nothing. But it's by experimenting that we make advances in knowledge, and no one is really going to blame us because we tried."

Although production men give full credit to perforating and fracturing as production stimulants, they still want more precision. That degree of precision is what the service companies are now shooting for.

Reprints Available

Reprints of this report are being prepared, and will be available in October. Single copies will be sent to PETROLEUM WEEK subscribers on request without charge. Additional copies will be billed at the following rates: 1-10 copies, 50¢ each; 11-100, 40¢ each; 101-1,000, 30¢ each; over 1,000, 20¢ each. Address orders to:

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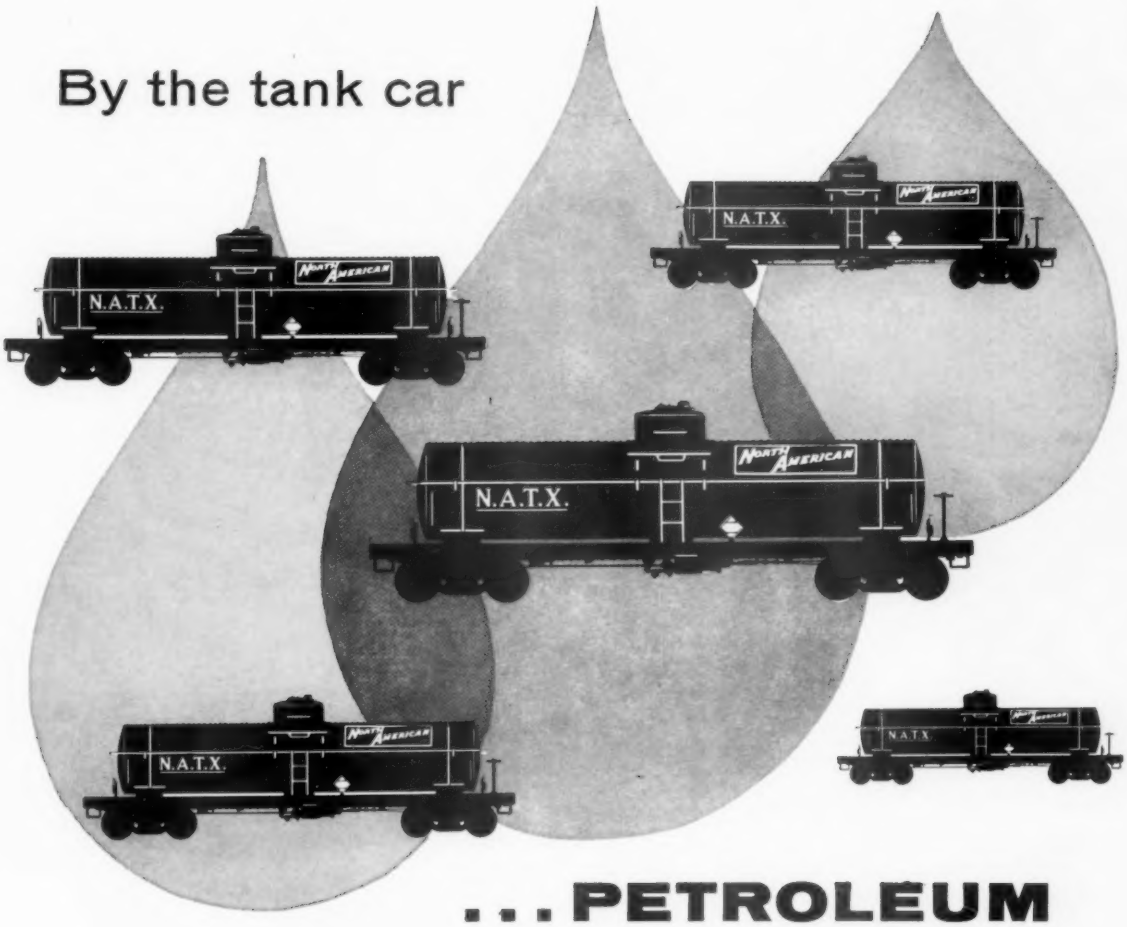

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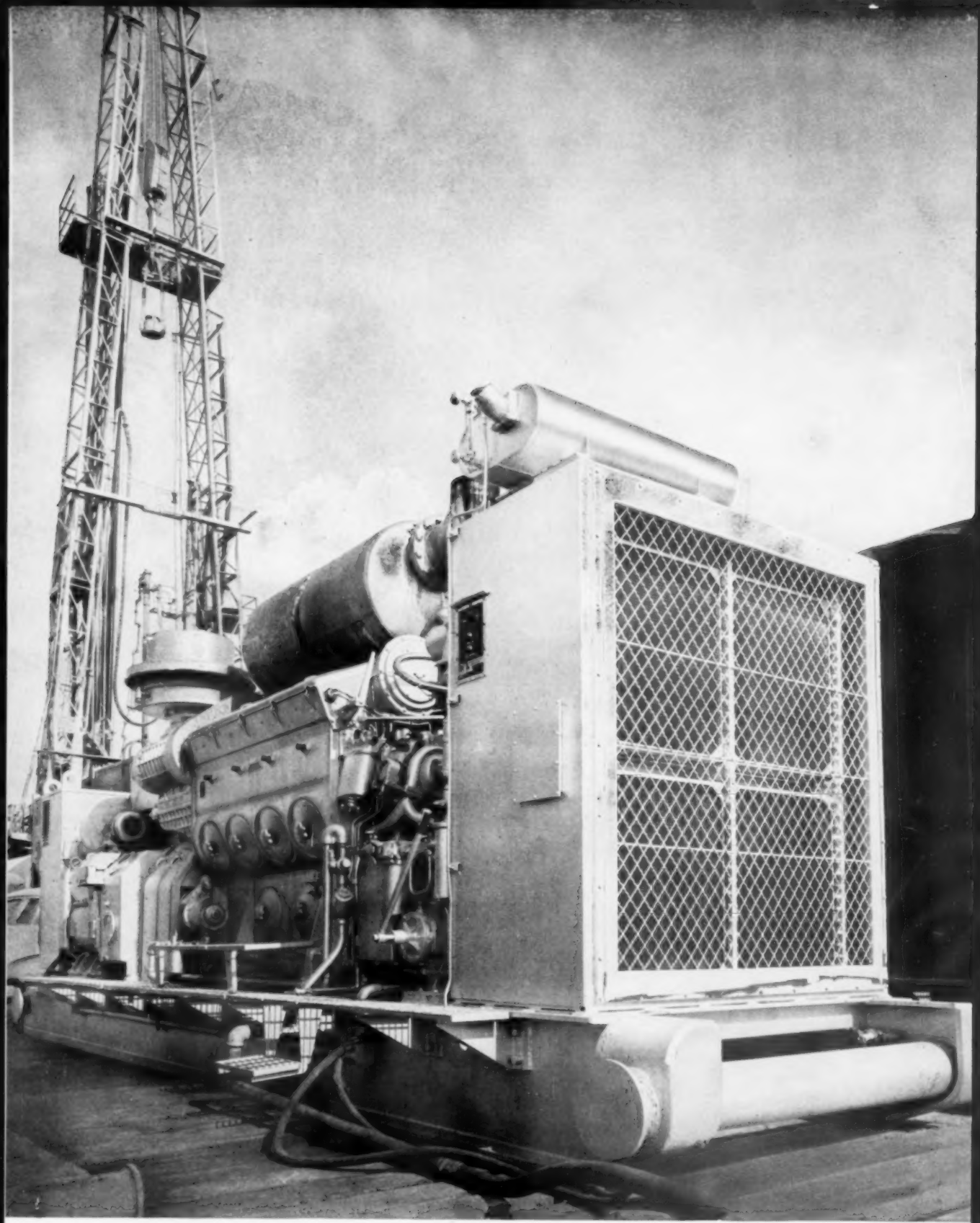

In operation on Sun Oil Company's Rig 15 at Rayne, La. is Electro-Motive's new drilling power unit, the SR-10. Main features include increased engine hp, increased generator and drive motor capacity, lighter weight, integral AC generator, simplified maintenance and load regulator control.

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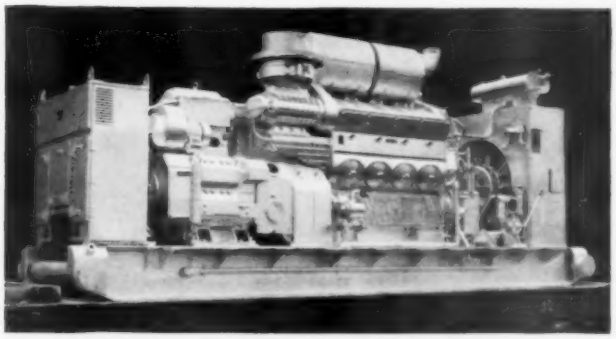
deep well drilling power

New Electro-Motive SR-10 Power Unit

In 1955, Electro-Motive introduced the first fully integrated Diesel-electric power system for oilwell drilling. Success of these units is demonstrated by the fact that Electro-Motive Power is widely used by drilling companies throughout the Gulf Coast area.

Now, Electro-Motive offers another first and significant contribution to the oil industry's increasing need to drill deeper, faster and more economically — the first standardized, completely self-sufficient Diesel-electric power system. These are its features:



The SR-10 is a refinement of Electro-Motive's original plan to build a *complete* and integrated Diesel-electric system designed and built to work as a unit with one manufacturing responsibility.

For detailed specifications on the new SR-10 unit, contact your Electro-Motive representative in any of the cities listed below.

INDEPENDENT AC SUPPLY

A new integral AC generator (100-KW) makes the SR-10 completely independent of outside supply for its own AC needs—blowers, exciters, control equipment.

INCREASED POWER

Engine horsepower has been increased to 1000. New D49-G generators produce up to 640-KW each (2 per engine). New D49-M drive motors deliver up to 800 horsepower.

GREATER POWER UTILIZATION

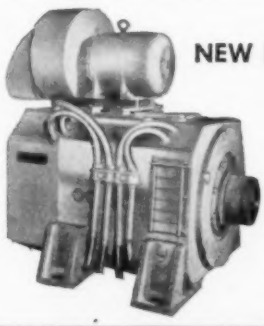
New load regulator provides load balance between units. Thus, if power requirements exceed that available on one unit, the load regulator automatically loads a second unit to satisfy drilling demands.

REDUCED MAINTENANCE

New improved motor control cabinet is simpler and more efficient. Its new design combines with many other improvements, both electrical and mechanical, to appreciably reduce overall maintenance time and expense.

LIGHTER WEIGHT

A new speed-increasing transmission between the engine and generators and other changes have cut the weight of the air cooled unit by more than 2000 pounds.



NEW D49-M DRIVE MOTOR

Improvements in design and materials of both the new motor and generator have appreciably increased horsepower and provided for better moisture protection. Motors and generators are identical except for field windings, a factor that facilitates service and reduces costs.

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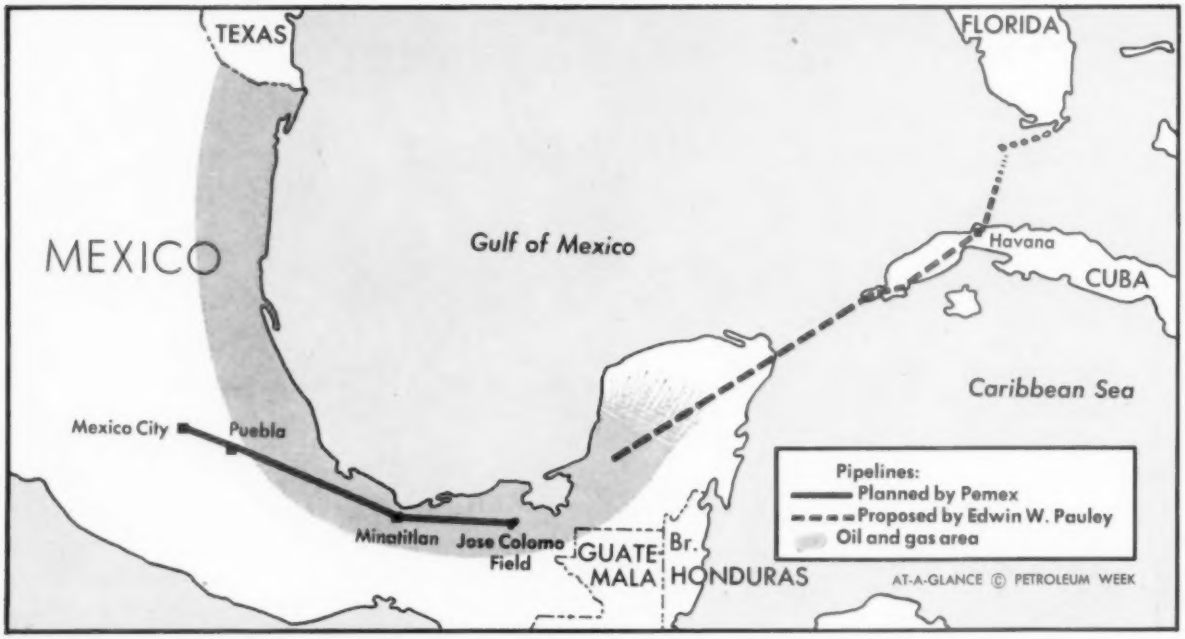

Mexican Gas Sparks Two Pipe Plans

MEXICO CITY—The current excitement in the U.S. over proposals for an export pipeline to tap Mexico's huge southeastern gas reserves is notable here only for its absence.

The plan proposed by Edwin W. Pauley to run a 650-mi. partly-submarine pipeline from Campeche, at the southeastern end of Mexico, to Cuba—and possibly on to Florida—is not new. It has been talked about for three years, according to a Pauley spokesman here.

What has sparked the sudden interest in the U.S. now, apparently, is that Petroleos Mexicanos has just started exporting gas to the U.S.—from the northeastern Reynosa gas fields, which Pauley helped to develop under one of several contracts with Pemex.

In 1951, CIMA (Mexican-American Independent Oil Co.) brought in two gas wells in Campeche, which are said to have proved reserves of 80-billion cu. ft. CIMA groups capital interests of Pauley, Petrofina, and American Independent Oil Co.

CIMA holds a 12-year exploration contract with Pemex on the area. It dates from 1949, with a 20-year payout period. Under this contract, CIMA gets paid a percentage of the value of production, plus a percentage of the profit. But it gets paid nothing unless the gas is produced and marketed.

Petroleos Mexicanos' position on the proposed Campeche-Cuba export line is an open one.

It agrees in principle with CIMA's desire to market the gas. Right now there is only a local gas line to Ciudad Carmen, capital of Campeche.

But Pemex will have to be offered a firm proposition on an export line before taking a definite stand.

The big question here is: Who would finance the estimated $140-million cost—even if the line proves technically feasible?

Observers feel the cost of the gas might prove prohibitive for Cuban users.

A spokesman at Pauley's Los Angeles headquarters said last week that Pauley and his associates probably will start discussions with Pemex, as well as with American & Foreign Power Co., a potentially interested offtaker in Cuba, if the line proves workable. A feasibility survey will be completed by Ebasco Services, of New York, in six to eight weeks.

In the meantime, a group of Americans and Cubans has formed Cuban Gas Transmission Co. in Cuba, with initial capital of $5-million. Its purpose is to carry out the project if it materializes. It is not yet clear whether this group contemplates financing construction of the line.

Much more concrete now is an immediate plan for a big—but strictly domestic—gas line that will tap Tabasco gas fields for the first time.

Pemex is continuing hush-hush negotiations here with several companies for construction, and probably financing, of a $60-million line to Mexico City (PW—Aug.30'57,p45).

The contract is expected to be signed very shortly, but Pemex isn't saying yet who is involved.

The line to Mexico City will run about 600 mi. from the huge Jose Colomo field, in the Macuspana region of Tabasco.

The first 18-in section to the Minatitlan refinery, is expected to be finished before December, 1958. From there, 24-in. pipe will run to Puebla and Mexico City. This section is planned for completion by about 1961.

Industrial consumers at Minatitlan —principally sulfur companies—will use about 50-million cu. ft. daily. But Pemex's big customers will be industrial users in the Puebla and Mexico City areas.

The Jose Colomo field is said to be as big as all of the gas fields in the exporting northeastern Reynosa area combined.

The field, on an anticline 7.5 mi. long and 1.6 mi. wide, has proven reserves of 1.8-trillion cu. ft. of gas, and probable reserves of 2.4-trillion cu. ft.

The proven reserves are calculated

on the field's "D" horizon alone, a 1,000-ft. section starting from the 6,600-ft. level in Lower Miocene sands. Pemex, however, plans to produce gas from the lower "E" and "F" horizons, as well as from the "D."

The field has shallower gas and oil sands above these members. The "A" horizon is a gas area with 300-ft. maximum thickness, beginning at the 4,300-ft. level; "B" is a 30-ft. oil area beginning at 4,800 ft.; and "C" has 100-ft. oil sands starting at the 5,300-ft. level.

(Pemex is currently producing about 1,000 b/d of 43-gravity crude from the "B" and "C" horizons. This is transported by an existing pipeline to Minatitlan, where it is mixed with heavier crudes.)

Other nearby gas fields, which Pemex could also tap for the planned gas line, are Vernet, Bitzal, Chilapilla, and Fortuna Nacional.

Meanwhile, Pemex is aiming for October completion of its 300-million cu. ft. daily gas absorption plant to treat Jose Colomo gas.

At the moment, though, December completion looks more likely.

The plant is located about 5 mi. from the Jose Colomo field, a few miles inland from the Gulf of Mexico, in swampy jungle lands. It was engineered by Hudson Engineering Corp., of Houston, as a virtual duplicate of the unit at Reynosa.

To support the plant, a community called Ciudad Pemex has been set up. It will have a population of 1,500 when the plant opens.

For the start of operations, Pemex has drilled 58 production wells and 13 reinjection wells at the Jose Colomo field.

Initially, Pemex expects to produce about 15,300 b/d of liquid hydrocarbons at the new plant, and to reinject all of the dry gas into the Jose Colomo reservoir at 4,000 psi.

Present underground pressure of the gas field is 3,520 psi. The minimum life of the field, without reinjection, has been estimated at 18 years.

Pemex will sell the gas when the pipeline outlet is built. At that time, production of liquid hydrocarbons at the Ciudad Pemex plant will be 13,650 b/d.

A products pipeline already has been completed between Ciudad Pemex and the Minatitlan refinery, where a special primary distillation plant is now under construction.

In less than two years, Pemex expects sales of liquids alone will more than cover its $27-million investment in development of the Jose Colomo field and ancillary installations.

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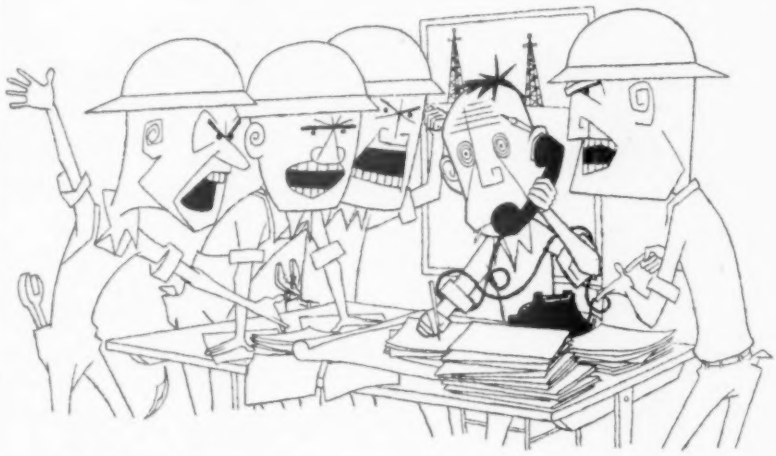

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New Mexican 'Field' Reported

MEXICO CITY—The third new oil find in the San Andres area of east-central Mexico has been announced by Petroleos Mexicanos, the government oil monopoly. The strike further boosts Pemex's hopes that the area (PW—Jan.18'57,p32) will prove to be the most important producing region it has discovered since expropriation in 1938.

Pemex brought in the new discovery last week at Gran Morelos, 8 mi. southeast of the San Andres field. It gave no report on test results. The well is now being drilled below 10,000 ft. Top of the limestone formation was encountered at 9,647 ft.

Pemex hopes the three finds will turn out to be one oil pool.

The first, San Andres, discovered in June, 1956, 21 mi. southeast of the prolific Poza Rica field, is now producing 28,000 b/d from 23 wells. Two of the wells are averaging 3,000 b/d, according to the government agency.

The one well at Hallazgo recently brought in about 4 mi. southeast of San Andres (PW—Jun.28'57,p47), is producing an average 600 b/d through a 13-mm. choke.

Oil from all three finds, which Pemex designates as "fields," is 20-gravity.

Meanwhile, Mexico's "combined" oil and gas reserves are now reported at their highest point since oil was discovered in 1901. However, Pemex does not give a breakdown of oil reserves specifically.

Reserves of oil and "gas-equivalent" were over 3.3-billion bbl. on Sept. 1, 1957, according to President Adolfo Ruiz Cortines' annual State of the Nation address.

This is a rise of a half-billion bbl. from a year earlier.

Other highlights of the report:

A total of 16 new oil and gas fields were established in the past 12 months, Pemex says. Eight were oil fields, and eight were gas.

For the first time, oil production was established in the Jurassic strata, in the Constitutiones and the Tamaulipas fields. Both are in the Ebano-Panuco district.

Crude oil output slumped to a 253,000 b/d average in the 12 months ended Sept. 1, down 12,000 b/d from the previous 12 months. including both oil and gas-equivalent, production averaged 324,133 b/d. Production was cut back at both the Poza Rica and New Golden Lane fields.

In the coming 12 months output of oil and gas-equivalent is expected to rise to over 400,000 b/d. One reason is that gas has now started flowing from Reynosa to Texas Eastern Transmission Co. at a minimum rate of 125-million cu. ft. a day. Another reason is the development of the San Andres area.

A total of 373 oil and gas wells were drilled in the 12-month period, including 98 wildcats and 275 extension and development wells.

Footage drilled amounted to 2,443,234 ft., topping the figure for the previous year by 33,168 ft. Pemex has been going deeper for production in the past several years.

In all Pemex had 108 drilling rigs, and 45 repair rigs.

During the last year, Pemex had 47 exploration crews at work.

Imports amounted to about 14.1-million bbl. and exports 13.4-million bbl. Fuel oil accounted for virtually all of the latter figure; imports were mostly light products.

Sahara Draws More U.S. Firms

PARIS—Jersey Standard and Sinclair are the latest U.S. companies rumored to be on the verge of joining the race for Sahara oil rights.

Officials of Jersey Standard and Cie. Francaise des Petroles last week refused to confirm or deny a report here that the U.S. major is dickering to join CEP in exploration on condition that it get majority interest.

CFP is sill awaiting the French government's response to applications filed earlier for six Sahara areas not previously held under concession. Two of them are close to Hassi Messaoud, and another is close to Edjele, two oil discoveries made thus far. Jersey Standard holds acreage in neighboring Libya, adjacent to Edjele.

Financial circles here also report that Sinclair will have the largest single interest in another group teaming up to apply for rights. The others are Newmont Oil, Soc. Francaise de Recherches et d'Exploitations du Petrole, and the Labard bank.

British, Dutch Companies Set Production Record

LONDON—British and associated Dutch oil companies increased production last year to a record total of over 2½-million b/d, according to the Petroleum Information Bureau. This represents a boost of about 140,000 b/d over 1955—despite interruptions due to the Middle East-Suez crisis.

The British and Dutch interests were second only to U.S. companies as principal world producers. The U.S. companies produced a total over 11.4-million b/d.

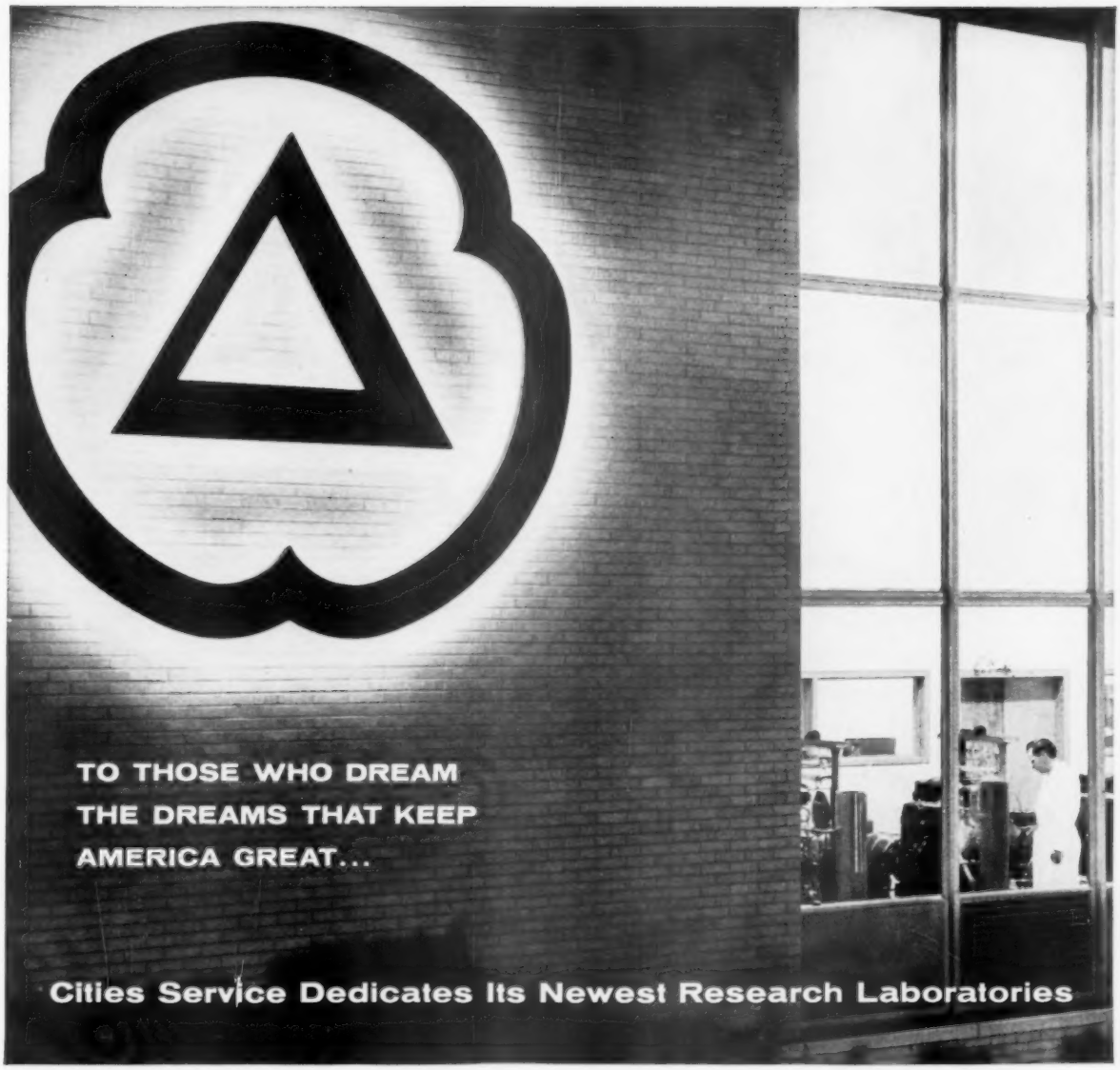
The British-Dutch total was derived from more than 20 different countries.

Iranian production is not included in the PIB totals for the British-Dutch and U.S. companies. British and Dutch interests obtained approximately 50% of Iran's output of some 26.5-million tons, PIB says. But even including this share of Iranian output, the Western Hemisphere still accounted for a larger share of British and Dutch oil production.

1956 Ownership of Oil Production

(Thousands of metric tons, including natural gasoline)

Area	British & Dutch	U.S.A.	Other	Total
North America	18,760	377,700	10,320	406,780
Latin America	46,230	95,090	20,550	161,870
Middle East & North Africa	47,325	88,280	37,165	172,770
Far East	12,130	7,680	300	20,110
Western Europe	775	2,565	6,960	10,300
U.S.S.R. Bloc	—	—	97,100	97,100
WORLD TOTAL	**125,220**	**571,315**	**172,395**	**868,930**



Cities Service Dedicates Its Newest Research Laboratories

Cities Service believes it is altogether fitting that its splendid new research laboratories at Cranbury, New Jersey were dedicated to those who will use them so wisely and well.

Often unsung, sometimes unappreciated, the men of science in the industrial laboratories of the country are a national resource beyond the command of money.

They kindle the fires of imagination and keep them burning. They spark the constant development of new products and the continual improvement of established ones. Because of their dedication to the new and better, management can build, salesmen can sell, every business can grow in usefulness, and the public benefits.

Joining four other great Cities Service laboratories, these newest facilities will provide the most advanced equipment for research in petroleum and allied fields. Included is a modern nuclear section for long-range research in the field of process development, fuels and lubricants—the heart of which is the largest concentration of irradiated cobalt ever to be supplied by the Atomic Energy Commission's Brookhaven National Laboratory.

Cities Service is proud, indeed, of its modern new laboratories and their advanced equipment . . . but takes far greater pride in the men who will man them. It's their dedication and skill that spark our growth and our service . . . for today and for tomorrow.

CITIES SERVICE

What's New / AROUND THE WORLD

Warning on Iran Oil Bids

IRAN—National Iranian Oil Co. has issued a warning that proposals for new oil rights must be made directly to NIOC itself. "Any communications made through other channels shall have no effect."

A statement issued on Sept. 1 further says:

"The National Iranian Oil Co. hereby informs all interested persons and companies that, in accordance with the provisions of the Iranian Petroleum Act of July 31, 1957, any inquiries, requests for information, or proposals of any nature whatsoever in connection with the performance of petroleum operations in Iran must be addressed direct to: The Chairman of the Board of Directors, National Iranian Oil Co., Avenue France, Teheran, Iran."

Meanwhile, an English translation of the NIOC exploration contract with Italy's AGIP Mineraria is now available.

Copies may be requested direct from NIOC at the above address.

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Phillips Joins Pauley

JORDAN—Phillips Petroleum last week confirmed that it has acquired a half-interest in the Edwin W. Pauley concession covering one-third of Jordan.

Parker Drilling Co., of Tulsa, is now drilling below 4,000 ft. on No. 1 Safra, the first Pauley test. It is located 35 mi. southeast off Amman.

Meanwhile, the Jordanian government is reliably reported asking stiffer terms for an Italian concession on another one-third of its territory.

The group that is negotiating for the concession is believed to be the Italian government's Ente Nazionale Idrocarburi.

The government reportedly wants the Italians to get a faster start on drilling in order to catch up with the Pauley operations. For reasons which observers could not explain, it appears the government wants information on its entire territory to come in simultaneously.

The Minister of Economy has refused to confirm reports that a concession over the second third of Jordan's acreage has been earmarked for Guatemalan businessman Jorge Zimeri. His previous bid for the acreage fell through last year (PW—Dec.14'56, p42).

•

Services Expand Abroad

MEXICO—Weatherford Oil Tool Co., of Houston, is expanding its manufacturing facilities here with an eye on export to Central America.

Its Mexican subsidiary, Fabrimex S.A. de C.V., under a new $60,000 expansion program, will build new facilities for finishing imported forged-steel products, such as unions, bull plugs, and swedges. Production of these items is slated to begin in about two months.

Weatherford reportedly is considering establishing manufacturing affiliates in Europe and in South America, particularly Venezuela.

VENEZUELA—Geophysical Service Inc., Dallas, is establishing a seismic data processing center in Caracas to service field parties in South America.

More than $200,000 worth of electronic equipment left Dallas by air freight last week for the new processing center.

It will be the third such center for the company; the others are in Dallas and New Orleans.

SWITZERLAND—Dresser Industries has opened new offices in Zurich to serve the expanding European market.

The office is under the direction of Dresser, A. G., the company's European subsidiary, which has sales and service representatives throughout the Eastern Hemisphere.

It also coordinates operations of the parent company in England, France, Germany, Holland, Italy, and Greece.

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First Refinery Planned

SWITZERLAND—The first refinery in Switzerland will be built by a Swiss investment company.

The plant will be located near Stabio, not far from the Italian border, in the Canton of Ticino.

Size and other details were not announced by So. Financiere Italo-Suisse, an important investment firm that mainly interests itself in financing electrical and steel projects in Switzerland and Italy.

Switzerland's oil demand has been climbing fast. Product imports have tripled, from about 20,000 b/d in 1950 to nearly 60,000 b/d in 1956. Most of them have come from Italian refineries.

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IRAQ—Prospects for speedy Iraqi approval of a new pipeline route to non-Arab Turkey are discounted in Middle East oil quarters.

Not even Syria's leftward turn has convinced the Iraqis that they should okay a Turkish outlet for the proposed giant Mideast line through Iraq.

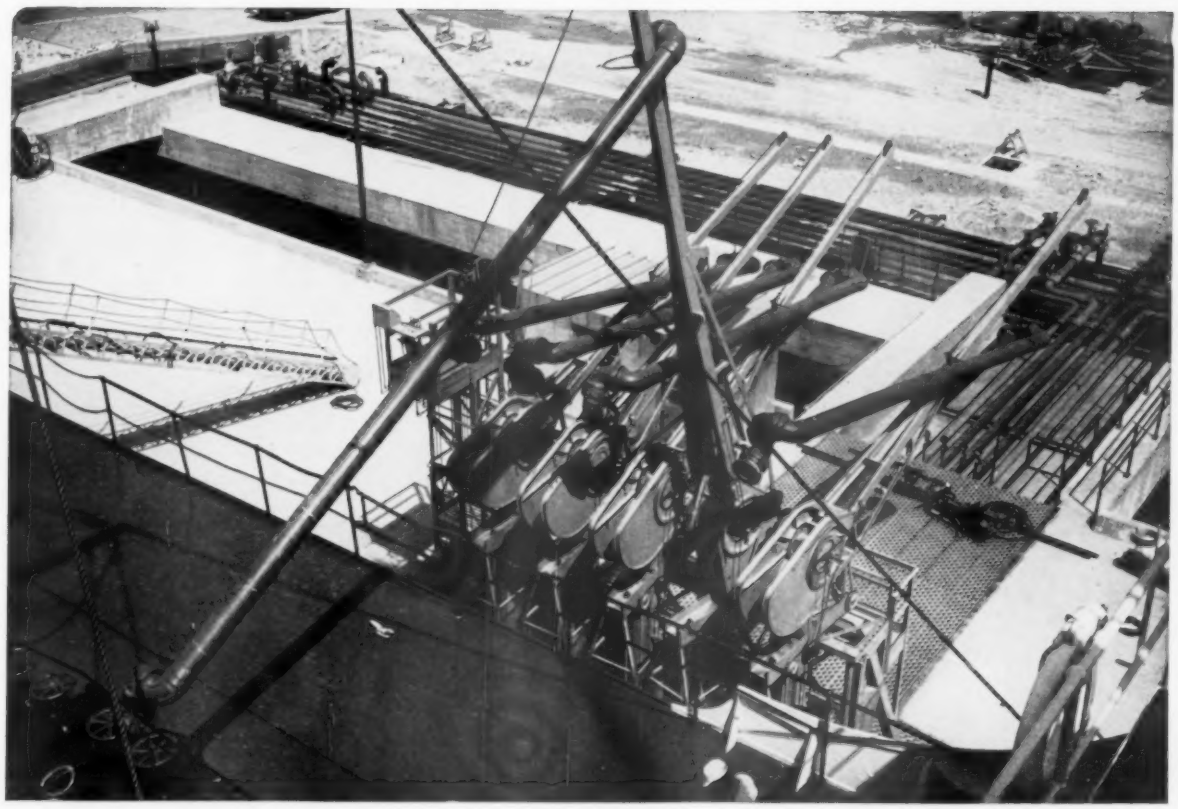
Economy Minister Nadim Pachachi is still particularly opposed to non-Arab outlets for Arab oil. His position thus remains unchanged from that expressed to PETROLEUM WEEK last spring (PW—Apr.19'57,p48). "Iraq oil," he said then, "should flow through Arab countries because we are Arabs."

Although government-to-government conversations are being continued at the ambassadorial level on the Western proposals, it is unlikely that any plans will be approved by the present weak Iraqi cabinet. At any rate, there is no official reaction thus

Supplies for Turkey

Socony's exploratory operations in Turkey will get a push when this equipment arrives at the port of Iskenderun.

The drilling truck (above), being loaded aboard the "Norman Lykes," is part of a huge array of vehicles and equipment being shipped to Turkey by Geophysical Associates International, Inc. Assembly of the materials was handled by Exploration Equipment Co., Houston. They include seismic equipment and everything needed to house and feed 40 to 50 people.



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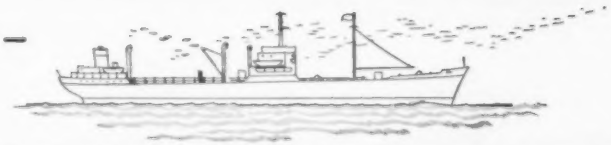

CHIKSAN MARINE LOADING ARMS

GIVE A MODERN DAY LIFT TO TANKER LOADING!

Hooking up hose lines to a tanker is often a rough, dirty, and sometimes dangerous task. However, loading drudgery is becoming just a memory wherever the new Chiksan Marine Loading Arm has gone into service. Heralded by many as the first basic improvement in the loading of marine tankers in over 30 years, the new Chiksan Loading Arm not only insures faster tanker turn-around time, but promises material savings of lost man-hours due to hose handling injuries, insurance and compensation premiums, and expensive rubber hose replacements. Savings within a decade, one customer estimates, will actually amount to the purchase price of a 5-arm unit. For descriptive literature, write Chiksan, Brea, California.

Where once a crew of seven men labored for 30 minutes to hook up a rubber line, now one man operating hydraulic controls can swing a Chiksan Loading Arm aboard, for hook up, in less than a minute.

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far. Oil men say that only strong-man ex-Premier Nuri es-Said could have o.k.'d such a project, stamping out all arguments. But chances of his return to power are regarded now as only 50-50.

Meanwhile, highly placed Lebanese say Iraq is opposing the Turkish line in hopes that there might still be a change in Syria.

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BOLIVIA—Drilling & Exploration Co. is seeking exploration rights over 1,235,000 acres in Zone 1.

Charles R. Rider, chairman of the board, disclosed that the newly-formed Bolivian Petroleum Corp., which filed the applications, is a wholly-owned subsidiary of the Dallas-based U.S. producing company (PW—Aug.30 '57,p46).

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BELGIUM—Petrofina's former official but little-used name has been dropped. The fast-expanding Belgian oil company is now officially and simply: Petrofina.

Stockholders approved the change from the former full name: Cie. Financiere Belges des Petroles, S.A. ("Petrofina").

•

VENEZUELA—Superior Oil Co. will ship its new Lake Maracaibo production through the La Estacada terminal of Talon Petroleum C.A. The terminal is on the east side of the lake, opposite the city of Maracaibo.

Superior plans to increase storage facilities on Talon's lake-front property by building two additional tanks, of 55,000 bbl. and 180,000 bbl. capacity.

This would bring total crude storage available to 370,000 bbl.

Talon has already completed plans for new pumping stations at the terminal (PW—Jul.26'57,p49).

Superior recently completed two wells on its new Lake Maracaibo acreage, with a combined capacity of about 10,200 b/d. The company was the first newcomer in the area to produce oil (PW—Jul.12'57,p33). Talon will handle all of Superior's shipments. The terminal can accommodate seagoing tankers.

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VENEZUELA—Four aluminum jackets for offshore drilling platforms—the world's first aluminum offshore structures—are being installed in Lake Maracaibo.

The prefabricated jackets were designed by J. Ray McDermott & Co., of New Orleans, and Reynolds Metals Co., Louisville, Ky. The jackets are tailor-made for specific locations. They are the largest all-welded aluminum structures ever built.

The platforms have steel decking and piling. However, all parts exposed to water are aluminum. Steel piles are driven inside each of four 34-in. aluminum legs. A fifth leg in the center serves as conductor for the drilling pipe.

The units can be re-used by shooting off the piling.

The first of these jackets has been installed for Superior Oil Co. The structure is 111 ft. in height, with only about 10 ft. above water. The other three will range up to 121 ft. in height.

Superior's unit took five days to erect. It is estimated that the other units can be installed in about three days. Most of the offshore derricks now on the lake are erected on concrete piles, which take up to 25 days to install.

A high-strength aluminum alloy that has been tested for several years in the lake is being used.

The second units is scheduled for the Sun Oil group, and the other two for the Singal Exploration group.

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Write to The Royal Bank of Canada, Oil and Gas Department, 409 Eighth Avenue West, Calgary, Alberta, for a list of current *"Oil and Gas Bulletins"*. These "Bulletins" are revised constantly, will bring you up to date on regulations, tariffs, oil and gas financing, basic statistics, and kindred subjects.

We do not provide information on oil securities.

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Houston, Texas

Equity's Mike Dougan shows . . .

How to Keep an Independent Growing

"You have to play this oil game with your eyes wide open," says J. L. (Mike) Dougan, hard-hitting, practical head of Equity Oil Co., of Salt Lake City. By following this precept, Dougan and his company have prospered.

Since Dougan became president of Equity in 1938, the company has gone in only one direction in net worth and daily production—up. The firm's stock, originally sold by Salt Lake City promoters at a few cents a share, was recently quoted at about $30. Equity's resources include 3,500 b/d of net crude production, 200,000 acres of leasehold in Utah, Colorado, and Wyoming, and a half-interest in 4-billion potential bbl. of shale oil.

Dougan has also become an effective voice of the independents in the executive councils of the Rocky Mountain Oil & Gas Assn.

Dougan's most recent activities, which have created considerable interest in Equity on the part of New York investors, have been gas discoveries in the Piceance Creek Basin and exploration of oil shale potential in the Rifle area, both in western Colorado. The latter activity is shared with General Petroleum Corp. Equity has brought in a steady succession of gas wells on its 100,000-acre Piceance Creek leasehold since 1954.

Dougan has uncovered several uncommonly large "sleepers" in the past few years. One of these was the deep pay at Rangely field, Colo., one of the ten largest producing areas in the United States.

A self-made oil man, Dougan got his start in the business when major companies shied away from wildcatting and independents found oil by cable tool in 3,000-ft. "deep tests."

Born in Plankington, S. D., of parents with Northern Ireland heritage, he was raised in Mason City, Iowa, and attended the University of South Dakota. Education lost its appeal for him. He went to Oklahoma with a few dollars in his pocket to join the Okmulgee lease rush.

Service in World War I only briefly interrupted his lease-buying. His interest spread to Colorado, Texas, and Wyoming's Lance Creek.

Early in the 1920s, Dougan incorporated Utah Southern Oil Co. with other oil men.

J. L. (MIKE) DOUGAN (left), with Equity engineer J. V. Collins, watching flow from first commercial well in Utah.

Dougan describes himself as an "in and outer" on oil deals up to the mid-1930s, when he became interested in Equity shares.

After assuming Equity's presidency in 1938, Dougan gradually acquired shallow rights in Rangely field. He also picked up a number of choice deep rights in the Weber formation.

Shallow production had been established in the field's Mancos shales. Major companies were represented in the play, but the rough terrain and great distance from the market militated against extensive development of the field.

Dougan figured that no independent would ever be fundamentally secure until it obtained a guaranteed outlet for its production. Standard Oil Co. of California provided the outlet, and also association with a major. California Standard's subsidiary, The California Co., had been given a large budget and the job of finding oil in the Rocky Mountains. It found that Equity and Utah Southern had grabbed off all of the choice shallow and deep rights at Rangely, where Calco was preparing for a new attempt in the Weber.

Dickering between Dougan and Alco took a year. "Perhaps I could have obtained more than a net 22% for both Equity and Utah Southern," recalls Dougan, "but it was more important to our future to be associated with a major than to go it alone."

Emerald No. 1 was drilled in 1944 and completed in the Weber for a flow of about 500 b/d of high-gravity crude. And a 3½-mi. stepout turned out to be a big producer.

California Standard, assured of an ample crude supply for many years, invested more than $50-million over the next ten years in pipelines, refining facilities, and other equipment.

A Dougan wildcat, No. 1 Ashley Valley established the first commercial production of oil in Utah.

In the 1950s, discoveries of oil and gas in the Tertiary of the Uinta Basin led Dougan to investigate the possibilities in the adjoining Piceance Creek Basin of Colorado.

Dougan sensed that developments were slow and that lessors were unhappy with the pace of drilling and other programs. (At least, they wanted holes drilled that might supply water for their ranch cattle.)

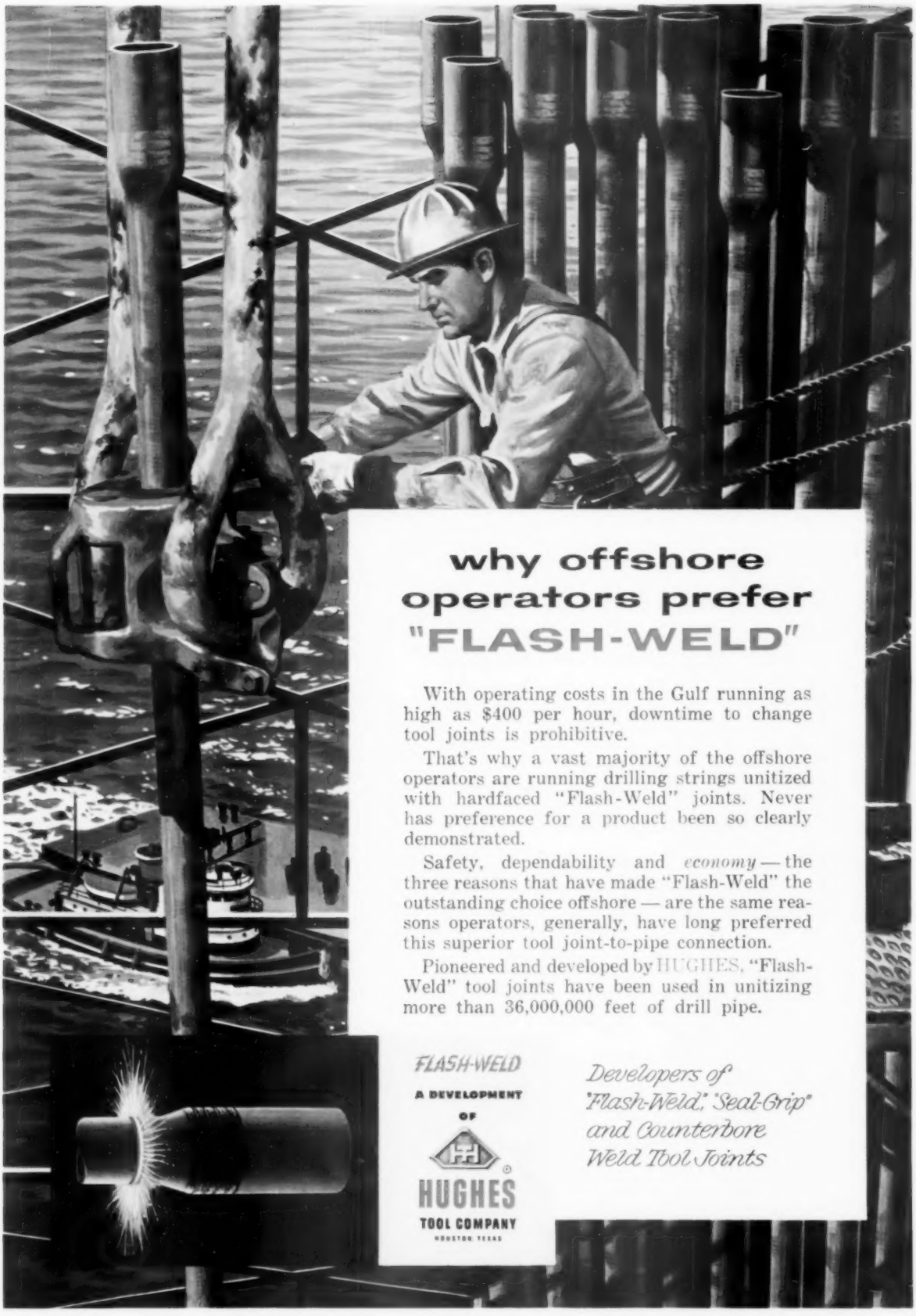
Several years of lease acquisition preceded discovery of natural gas on Equity's southeast Piceance Creek block. In 1956, the firm established production in the northern part of its holdings with the No. 1 Sulphur Creek wildcat. Again Equity had secured a position out in front.

During this same period, Equity joined in acquiring interests in 23,000 acres of oil shale reserves in the Mahogany Ledge in Colorado. Equity bought out one of the participating groups, and now is a 50-50 partner with General Petroleum Corp.

Dougan is known by fellow oil men for two characteristics—a "feel" for the territory and a cautious reluctance to talk about his properties. Few oldtimers and practically none of the newcomers in the business have walked as much ground and covered as many likely producing areas as Dougan has surveyed personally.

A fellow oldtimer in the business says that the only way to get any information from Dougan is to ride with him on an airplane on a long, long trip, sitting next to him and saying nothing until he ultimately relents and drops a few small words.

Dougan has little to say of the recent spectacular Equity stock price increases. "Maybe we'll have a story some day," he says with a quiet grin.



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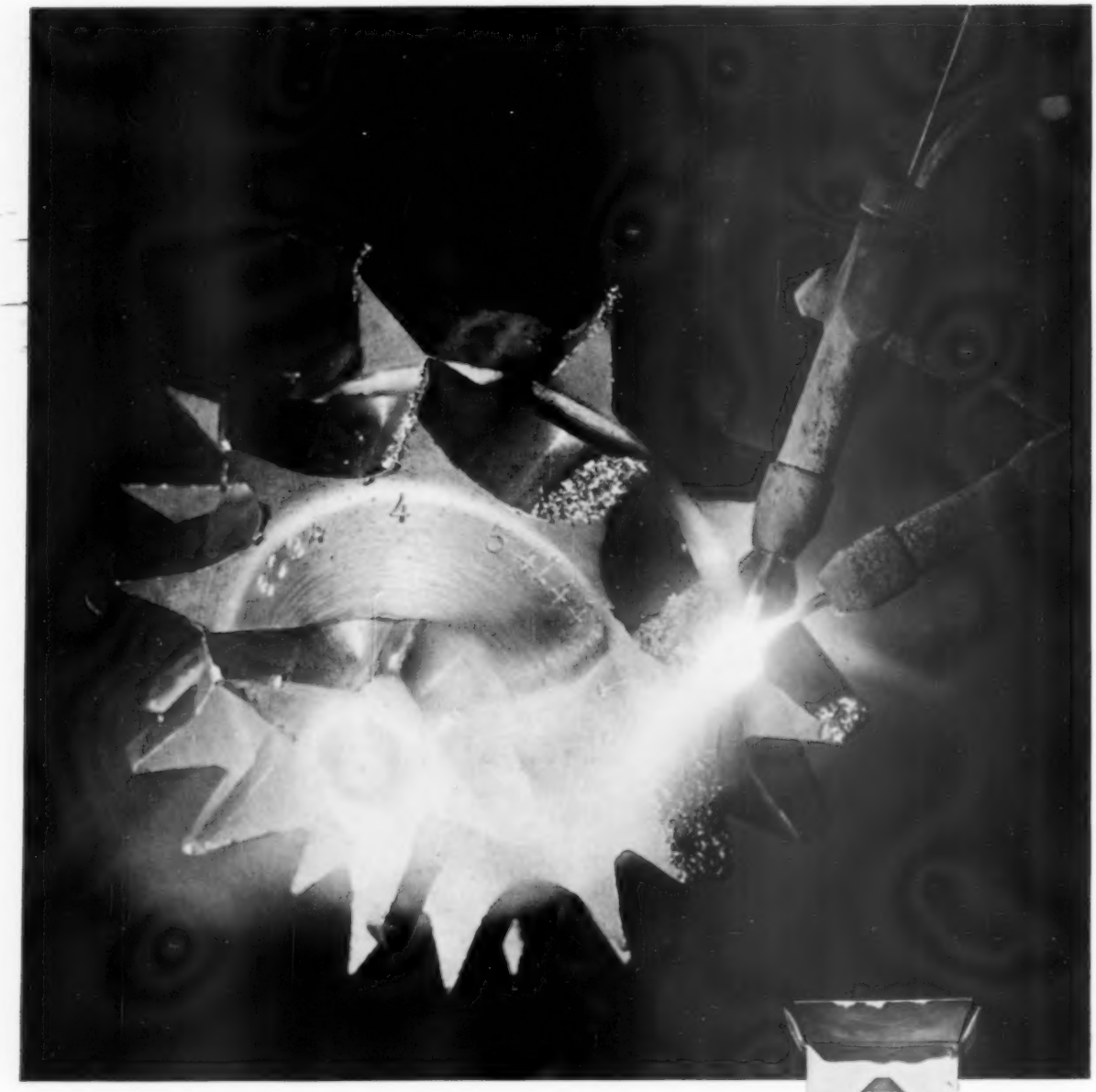

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BATTLE FOR MARKETS is summed up in oil- and gas-heat billboards placed side by side in Portland, Ore. Now that natural gas is available, both industries are girding for a long promotional fight. The outcome will answer the question:

Will Oil or Gas Win the Northwest?

With big pipelines pouring natural gas into the Pacific Northwest, the big question is: Can oil heat survive? Yes, say both oil and gas men, but they predict a long, drawnout promotional battle over markets.

The Pacific Northwest has long been a stronghold for oil heat. Last fall natural gas reached the area—through the line of Pacific Northwest Pipeline Corp., which brought gas from the San Juan basin, in the Southwest. The line extends to the Canadian border, where it will connect with West Coast Transmission Co.'s pipeline from the Peace River area.

Gas has already made big inroads into the market and is growing rapidly. So far, oil has held steady—and has at least 65% to 70% of the market in most areas of Washington and Oregon.

Electric power has served to put the brakes on the growth of gas use in the Pacific Northwest. It gives both oil and gas some stiff competition. In some areas, in fact, fuel oil distributors are more worried about power company competition than gas competition.

The power industry not only gives the customer another choice of fuel (thus confusing the issue), but also takes away a part of the load that gas normally would get without any competition at all. A customer who orders a gas furnace often prefers electricity for cooking and water-heating. This limits the load that gas can build up.

One Seattle dealer says that he lost more accounts to electricity than to gas last year—although the losses were only slight.

Oil dealers and jobbers are saying that they don't expect to lose more than 1% or 2% gallonage in furnace oil. The most vulnerable spot here is in new, large-scale housing projects. In a large development east of Seattle, 472 new homes had gas units, as against 23 oil and 1 electric. In another nearby development, the first 108 houses have gas heat.

Many of the area's residents—unfamiliar with gas heat—are hesitant to accept it. Oil heat's stepped-up promotion has capitalized on this fear by emphasizing the safety of oil heat.

Oil heat men are promoting vigorously to hang on to their markets and to grab their share of new markets. Promotion is coordinated by the Oil Heat Institutes of Washington and Oregon, and is supported by distributors, refiners, and dealers.

Oil got much of its corner on the northwest's heating market by default, when sawdust disappeared as a cheap and available fuel. Many dealers paid little attention to service, equipment, or public relations. Now—with the new gas competition—dealers are finding that they have to go out and do the selling job they didn't do before.

OHI sponsors a dealer and employee education program, conducts sales and management meetings, and helps dealers analyze their cost systems. For the past three years, OHI has also conducted 400-hour technical schools to train oil heating service technicians.

OHI advertising hits all media, with special emphasis on newspapers and billboards. The billboard goal is to have 70% of the people see an oil billboard ad at least once a month between six and nine months of the year. Advertising budgets are getting bigger every year. Dealers contribute 1/20th of a cent per gallon on their previous year's sales; this is matched by suppliers.

The Seattle OHI unit (covering 19 of Washington's 35 counties) has increased its promotion budget over the past four years from $135,000 to $290,000.

Heading the Washington and Oregon OHI groups are Robert Elmslie and Dale Josephson, respectively.

Oil heat marketers feel that this sort of promotion will enable them to meet the challenge of natural gas.

OHI's Josephson appraises the outlook this way: "What the future holds for oil heat is dependent upon both the retail marketer and the supplier, in general upgrading of industry standards, and in public relations activities through cooperative OHI programs. The fuel oil marketer must provide an integrated oil heating service. It has been a good business, it can continue

to be . . . as long as the industry rises to the challenge."

Distributors are optimistic, too. Comments from leading distributors:

"Competition is always good, and natural gas is just another competitor."

"The tract builder is going hard for gas, but the custom builder usually sticks with oil."

"I expect oil sales to slow down this year and next, because of gas promotion, and then increase as the novelty of gas wears off."

Individual companies have been responsible for most of the gas industry's promotion in the Pacific Northwest. Cascade Natural Gas Co., for instance, did door-to-door canvassing in the Yakima area. Pacific Northwest Pipeline and Washington Natural Gas Co. have also launched big promotional campaigns.

Another leader in gas-heat promotion is Portland Gas & Coke Co. Its sales vice-president, Charles R. Holloway, Jr., was twice president of Oregon's OHI and was long associated with a large Portland fuel oil distributor. Portland Gas & Coke plans to spend $4-million between 1956 and 1960 on advertising and promotion.

Gas is expected to win a large share of the new-housing heating market, because gas-heat installations are cheaper than oil. The biggest losses to oil heat are expected to be in the space-heating market. (pot burners, heating stoves, etc., as distinguished from central-heating furnaces).

One oil man says that the following areas represent the biggest threat of gas to the oil heat market:

- Pot type space heaters. These are old heaters, formerly fueled with coal, later with stove oil. They are being replaced with gas or electric heaters.
- New housing. Oil-heat installations also require tank installations—boosting the cost, and thus making gas-heat installations more attractive.
- Replacement market. The impact on this very competitive market won't be felt for a while. Most units are five to seven years old, with a life expectancy of 20 years or so. Good heaters won't be thrown out, just to convert to gas.

Some marketers estimate oil's potential losses in the space-heating market at 25% to 50%. However, most dealers won't admit that they expect to lose more than 5%. Washington's OHI predicts that, even if the state's dealers lose half of their stove oil business, they could still sell 522,233,000 gal. of fuel oil in 1965. (This compares to 528,851,400 gal. of distillate fuel oils sold in the state in 1955.)

For oil heat:

Dale Josephson (left), Oregon OHI manager, and Robert Elmslie (right), Washington OHI managing director, had their promotion weapons ready for action long before the oil-gas market skirmish in the Pacific Northwest began.

For gas heat:

Charles H. Gueffroy (right), president, and Charles R. Holloway, Jr., (left), sales vice-president, of Portland Gas & Coke Co. are among the gas industry's active promoters. Company will spend $4-million on promotion from 1956 to 1960.

OHI's Josephson says, "If we can keep 50% of new installations, we'll still have a healthy business . . . but it won't accelerate as it has in the past. Business is going to be tougher to get and tougher to hold onto. We'll probably see the same amount of sales, but fewer people doing the business."

Most oil dealers are reconciled to the fact that gas is replacing oil as an industrial fuel, because most big industrial accounts were served by the oil companies directly, bypassing the dealer. And, as suppliers upgrade their refining processes, they expect to have less and less of the black oils available, so they're not too concerned either.

Meanwhile, gas companies are offering very low rates to build up industrial volume in a hurry.

Neither gas nor oil men want to talk much about price. In most areas, gas has a price advantage in home-heating costs, but there may be rate increases ahead.

A Seattle fuel and heating equipment dealer estimates competitive annual heating costs for the average house at: $150 for oil; $115 for natural gas; $188 for electric heat.

One advantage for gas customers: The gas company handles service at no charge, while most oil customers have to pay for maintenance.

The gap between oil and gas prices may be narrowed, however. Pacific Northwest Pipeline Corp. has petitioned the Federal Power Commission for a rate increase. Many gas distributing companies are opposing it. They feel that they should have had at least one year's development time before any rate boost.

Gas distributors are optimistic about their future growth, and expansion plans are going ahead. They feel that they will dominate the new construction market, and that, in a few years, consumer acceptance of gas heat will go up.

West Coast Transmission's 650-mi. line from the Peace River to the Canada-U.S. border is slated to be connected to Pacific Northwest's line by Nov. 1. Initial capacity of the Canadian line is 400-million cu. ft. daily. Pacific Northwest has contracted for initial delivery of 300-million cu. ft. daily.

Natural gas still is not available to about one-fourth of Washington's population, and to many areas in Oregon. Even in the pipeline areas, some customers can't get gas, because of a lack of distribution facilities.

Big natural gas markets are Spokane, Walla Walla, Yakima Valley, Longview-Kelso, all in Washington, along the Washington Natural Gas system from Chehalis, Wash., to Everett (including Seattle and Bellingham), and Portland, Baker, LaGrange, and Pendleton, Ore.

Some new areas will get gas if Pacific Gas & Electric goes through with its plans to run a $300-million line from Alberta through Spokane, cutting through Oregon to California.

Portland Gas & Coke is spending more than $5-million this year to expand lines and strengthen its system. The company estimates that it will spend $30-million between 1956 and 1960 on expansion.

HAVE YOU GOT THE FACTS ABOUT YOUR BUSINESS?

It's surprising how little oil's customers know about the biggest selling petroleum product—gasoline! They never see it or touch it—yet they *use* it every day. All they know is the price they pay . . . and only a few know how big a bargain they really get with today's gasoline.

You'll be helping yourself and your industry by giving oil's customers the *real* story about today's gasoline prices and taxes. Here are the facts:

Direct Taxes add 40 cents to every dollar spent for today's gasoline!

When you hear the phrase "gasoline prices are high," this is your best reply: "Gasoline *taxes* are high, but gasoline *itself* is a bargain!" Yes, it's true that for every dollar spent for gasoline, an additional 40¢ must be paid for federal and state gasoline taxes!

Mr. Average American Motorist—who drives his car approximately 9,360 miles a year—pays $56.76 in direct taxes on gasoline alone! That's an average of 8.8¢ a gallon—a rate four times higher than the federal 10% tax on "luxuries" like mink coats!

But let's look at the price of gasoline *itself*. Gasoline has gone up only a few pennies, in the last five years. Meanwhile, gasoline quality has improved tremendously, so that today's *regular* gasoline is as good as premium gasoline was only five short years ago. And today's *premium* gasoline is as powerful as the bomber and fighter gasolines of the last war.

So next time you are asked about gasoline prices, remember . . .

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What's New / IN MARKETING

Two major company spokesmen, apparently concerned over the many gasoline price war areas in the U.S., told Colorado jobbers last week that profit is more important than volume.

"Now that we've obtained the highest volume in history, let's manage some more profit," L. T. White, manager of business research and education for Cities Service Co., advised the annual convention of the Colorado Petroleum Marketers Assn.

His views were echoed by W. J. Gerwe, Chicago special representative of Socony Mobil Oil Co. Gerwe told the marketers that the "objective of your business should be profit, and not gallonage . . . there are too many jobbers who place too much emphasis on gallonage."

"The successful jobber is, and will be, the jobber who makes a profit on his gallonage," he added. "You must justify your economic value in this business of marketing petroleum."

•

A passenger aboard a Transocean Air Lines flight to Honolulu two weeks ago used his personal Shell credit card to fill up the plane's tank. A gasoline attendant at the Ontario (Calif.) municipal airport refused to sell the Transocean pilot Shell gasoline on his Standard or Esso credit cards. So Bill Hendrie, of Barstow, Calif., picked up the $1,135.58 tab. He won't get the bill, though, because Transocean arranged to have it sent to the company.

It was later explained that the airport attendant was a new man, who didn't know that Transocean has always been allowed to buy gas at Ontario without a Shell credit card.

•

Sinclair Refining Co. is in the midst of a big service station push in the Twin Cites area. It has opened 12 new stations and has let contracts to build seven more this fall and early next spring. "Many more" are scheduled to be built late next year, the company says.

•

Fuel oil consumption by electric power plants in July was down 11.7% from June, but up 27.5% from July, 1956, according to Federal Power Commission reports.

An Industry First: 'Lady's Credit Card'

The oil industry's first "lady's credit card" is out. It's the kickoff for Skelly Oil Co.'s new courtesy card and service program designed especially for women. The light blue, plastic cards will serve to remind station attendants to pay particular attention to the courtesies and services that appeal to women. Skelly has appointed Miss Eva J. Dunham special assistant in charge of the program; her job will be to keep management posted on the needs of women customers.

ARE YOU SETTING UP TO HANDLE ETHANOLAMINES?

The lower costs and easier handling that result from bulk purchasing are encouraging many ethanolamines users to install bulk facilities. The checklist below lists the important installation factors, and Jefferson's bulletin on Ethanolamines* covers handling and storage information in considerable detail.

But there's an easy way to evalute the economies of bulk purchasing . . . and to plan a suitable handling system. Just call in your Jefferson representative and let him do it for you.

Send for your copy today!

ETHANOLAMINES

. . . solidify at or slightly below room temperature. They will darken on exposure to air, and are hygroscopic. Iron and its oxides are relatively inert to ethanolamines, but copper and its alloys react to form complex salts.

Recommended are:

- Carbon steel storage tanks
- Heating coils of stainless steel
- Transfer lines at least 2" in diameter
- Pumps with all-iron parts

Color restrictions or temperature conditions may require:

- Nitrogen gas padding in storage
- Insulation of tanks
- Steam tracing of transfer lines

If used in aqueous solution, dilution in storage will lower the freezing point and reduce the viscosity.

Quick service on mono-, di- or triethanolamine is available from Jefferson's conveniently located stock points. **Jefferson Chemical Company, Inc., 1121 Walker Ave., Houston 2, Texas**

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DEPT/Refining

Electronic Brains Help Design Units

- **A "medium-sized" computer at Esso Research & Engineering Co. is handling many of the complex calculations necessary for design of refinery units.**
- **The result of this kind of computer use: big savings in time, money, and manpower. There'll be more of this soon.**

Esso Research & Engineering Co. this week told how it has been using electronic computer techniques to save time, money, and manpower in the design and cost estimation of refinery units.

An Esso Research spokesman, John W. Kellett, told a meeting of the American Chemical Society this week that Esso Research has been solving design and cost-estimating problems for refinery equipment electronically for about two years.

Electronic computers have long shown promise for a variety of refinery problems, such as maintaining a complete inventory-level materials-control program (PW—Jun.7'57,p55), and gearing refinery operations to short-term changes in supply, demand, and prices (PW—Nov.16'57,p73).

But designing refinery units is something else again. Now the computer shows great promise here too.

Several other engineering research companies now also use electronic computers for unit design calculations. Results at Esso Research may be called typical of such operations:

Esso Research estimates that it will save up to $1-million on one of the units—a naphtha fractionator—designed with the help of its IBM 650.

The company can only estimate at this point, because the unit has not yet been built. Construction will begin shortly at the refinery of one of Esso Research's affiliate companies. But Esso Research is confident that, when the totals are in, the savings from the use of electronic computer techniques will approach $1-million. One reason: design work on the unit was completed three months earlier than if it had been done "by hand."

A basic problem in such work is that no two refinery units are alike. All have to be tailored to the individual refinery's operation, types of crude available, and products wanted. This means that literally thousands of computations must be made.

The electronic brain has also been used to design heat exchangers and a light-ends plant, with important savings in time and manpower.

Calculations for a heat exchanger—when handled by the 650 ("a medium-size, high-speed computer")—take up to 45 minutes (not including the time needed for gathering input data and analyzing answers). By hand, a "reasonably well trained engineer" would take from one to two days to do the same job, an Esso Research representative told PETROLEUM WEEK.

Kellett says that the computer can advance the completion date on such smaller jobs "by three to four weeks."

A light-ends plant for depropanizing, debutanizing, and depentanizing process streams has also been designed with the help of the computer.

This kind of "engineering stimulation" of electronic computers has already improved design and made it more consistent, besides freeing engineers from the routine and repetitious chore of unit calculations.

And Esso Research feels that this is just the beginning. A possibility: design of a complete refinery, optimized by the used of electronic computers.

Esso Research certainly isn't going to stand still on this. The company is now awaiting delivery of a still larger computer, the IBM Model 704 "Memory," which will be able to calculate more quickly and with greater capacity than the 650. The 704, which can use some 300,000 digits at one time, will be used in Esso Research's planned expansion along these lines. Electronic computation will be done on a larger part of the design and cost estimating for all types of units used in petroleum and petrochemicals processing.

Kellett says the potential is great: "We have barely scratched the surface in this field. The real possibilities will come with integrated [calculations] when a design for a whole plant consisting of many units will be optimized."

East German Fuel Output Lags

East German diesel fuel and gasoline production facilities rank far behind those of West Germany, according to estimates recently published by the German Institute for Economics Research, in Berlin.

The institute estimates East Germany's total 1956 fuel production at 1,764,000 metric tons. This breaks down into 882,000 tons of gasoline, 52,000 tons of benzene, and 830,000 tons of diesel fuel. This is 3½ times as great as 1937 production of petroleum fuels in what is now East Germany. By way of comparison, West Germany produced 7,030,000 tons of petroleum fuels in 1956. This was seven times the 1937 production.

East German plants use several fuel production procedures, some of which are comparatively old synthesis methods. In West Germany, old synthesis plants have been replaced by crude petroleum refining plants.

East German fuel production uses coal hydrogenation (Bergius procedure), synthesis using brown coal as raw material (Fischer-Tropsch synthesis), and petroleum refining.

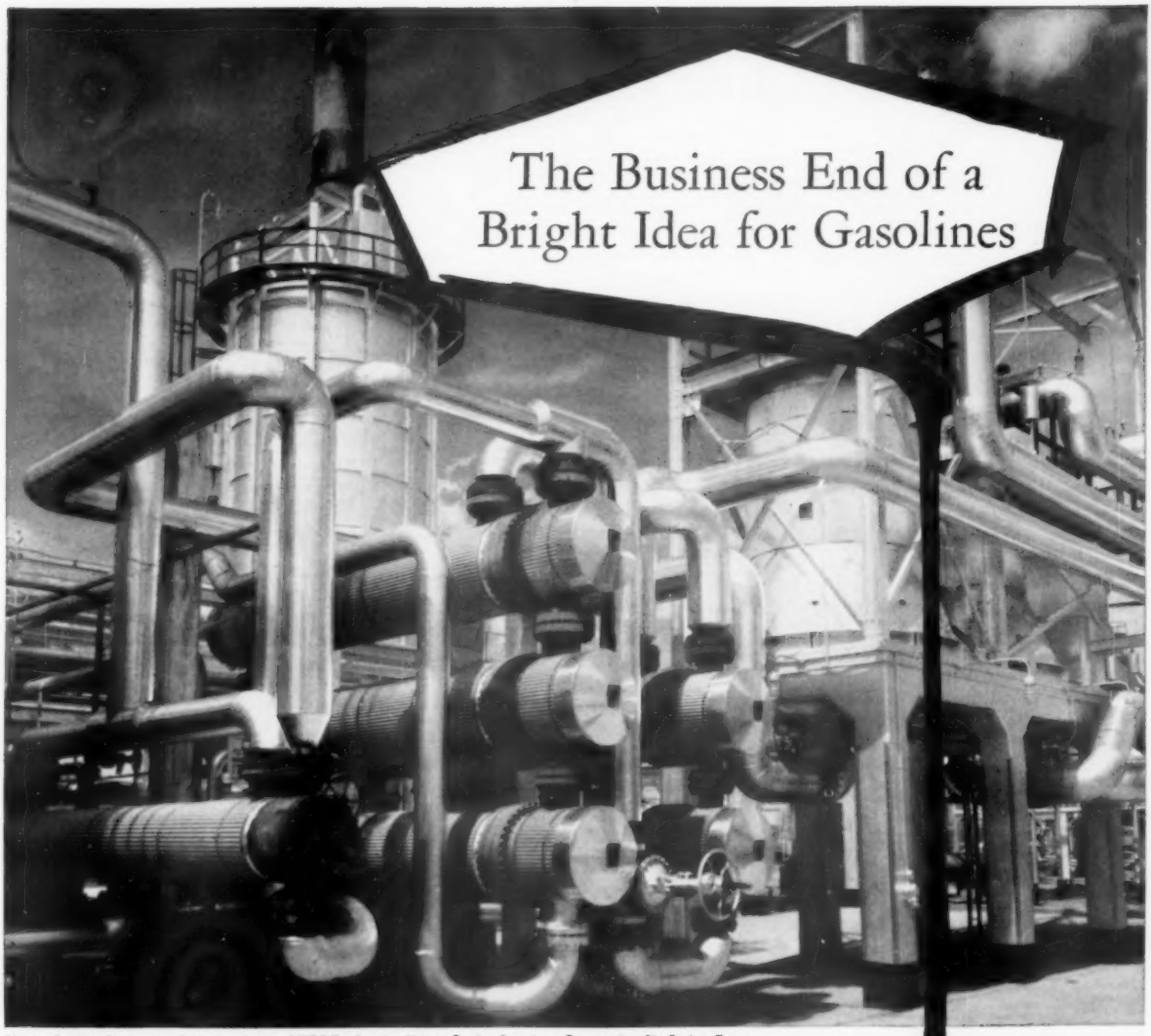
Per capita consumption of fuels is higher in West Germany than in East Germany, and costs of production are lower in West Germany.

The institute says that East German consumption of diesel fuel and gasoline is 80 kg. per person, compared with 260 kg. per person in West Germany.

Production costs of East German gasoline are estimated to be 10% higher than those of West German gasoline.

East Germany's expansion plans will still leave it far behind the Federal Republic.

If present goals are fulfilled, East German production will total 2,285,000 ton annually by 1960. The institute says, however, that most existing plants have been in operation since the war and need large repair investments. This factor, the institute believes, will slow further expansion.



The Business End of a Bright Idea for Gasolines

Heater, heat exchangers and reactors, heart of UOP Rexforming Unit at Cosden Petroleum Corporation, Big Spring, Texas.

This is the heart of the UOP Rexforming process, a new development in petroleum refining that produces automotive gasolines with the industry's highest octane ratings with remarkable efficiency and economy. The idea for Rexforming was born in Universal's research laboratories. UOP develops and designs the equipment required to make this process commercially practical. UOP field engineers follow every phase of construction and are right on hand to see that the actual plant functions smoothly from the very start. This is the full measure of Universal's service. From bright idea to smooth operation, it's a service that is available to all refiners everywhere.

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What's New / IN REFINING

St. Lawrence Waterway: New Foreign Crude Inlet?

The Oklahoma Independent Petroleum Assn. warns that eastern and midwestern refineries with a capacity of over 2.3-million b/d "could easily be served" by foreign crude coming in through the St. Lawrence Seaway upon its completion in 1962.

In a recent issue of its official publication, "Independent Oil," OIPA points out that, by 1962, Buffalo, Toledo, Chicago, Duluth, and Milwaukee will be "ocean ports"—thanks to the Seaway.

Foreign crude, "Independent Oil" says, could then be used to supply the following states (total refining capacity in parentheses): Illinois (543,400 b/d), Indiana (458,700 b/d), Michigan (156,200 b/d), New York (105,870 b/d), Ohio (420,280 b/d), Pennsylvania (673,360 b/d), and Wisconsin (11,000 b/d).

Much of this refining capacity, however, is already running on foreign crude brought in on the Atlantic Coast, and would be unaffected by the Seaway.

The publication says that "there are many [physical] obstacles to be overcome for the importer to make hay from the Seaway." The biggest obstacle, though, wouldn't be physical. A successful program to regulate crude imports would minimize this impact of the Seaway.

•

Canada's first plant for producing chemically pure benzene, toluene, and xylenes from petroleum has come on stream at Canadian Oil Co.'s Sarnia (Ont.) refinery.

The three aromatics are products of an integrated Platforming-Udex extraction unit, engineered by Universal Oil Products Co. and Canadian. Design capacity of the Platformer is 4,400 b/d.

This installation completes a $3-million expansion of the company's petrochemical manufacturing facilities.

•

Standard Oil Co. of California has filled in some details of its planned refinery for the Seattle (Wash.) area.

The refinery will be located on a 2,000-acre site on Puget Sound near Mukilteo, Wash., about 25 mi. north of Seattle. It will cost $75-million, and have an initial capacity of 60,000 b/d. Crude oil will be brought from Canada by pipeline and from California by tanker.

Initial products will be gasoline, kerosine, and heating and fuel oils. But the site is large enough to allow for expansion into such products as lube oils and petrochemicals.

•

The Western Petroleum Refiners' Assn. will hold its Rocky Mountain regional meeting at Casper, Wyo., Sept. 26-27.

Technical papers to be presented at the meeting will include: "Primary Tars as a Proposed Refinery Feedstock," by Dr. R. D. Law, of the University of Wyoming; and "Marketing and Manufacturing Problems of Asphalt," by Auburn Baccus, of El Dorado Refining Co.

•

British Petroleum Co. has set up a special department for petrochemicals.

BP set the department up because of its "increasing interest in petroleum chemicals manufacture." BP's refineries and technical department formerly had responsibility for petrochemicals.

•

A diesel fuel additive that reportedly counteracts obnoxious exhaust odors may aid both bus owners and the general public in the fight against urban B. O.

The new compound, Alamask DI-2K, is manufactured by Rhodia, Inc. It can be added to the diesel fuel while blending, filling, or loading.

Rhodia says Alamask DI-2K produces no toxic vapors and is completely safe for engines.

New Kind of Butadiene Storage at Baton Rouge

The fast growing butadiene capacity at U.S. refineries (PW—Jul.12'57,p42), is making for plenty of changes. At Esso Standard Oil Co.'s Baton Rouge (La.) refinery, for instance, this storage spheroid is undergoing considerable reconditioning prior to being put into butadiene service. First, a 3-in. layer of foam-glass insulation was applied in blocks. Then a mastic coating, an asphalt cutback reinforced with glass fabric, was applied to protect the insulation from weather and to act as a vapor barrier. A condenser will keep the butadiene at 45F.

Polyken Tape Coating Method again proves itself in rugged going

Versatile, easy-to-apply polyethylene tape by Polyken protects mountainous pipeline

Again, Polyken tape coating proved itself where the going got rough.

The problem was to protect a pipeline running through the rugged, coal bloom terrain between Kentucky Hydrocarbon at Maytown, Kentucky, and the Union Carbide and Carbon plant at Institute, West Virginia—100 mountainous miles with up to 60° slopes.

Here, the Polyken tape coating method, because of its tremendously simplified application, proved the answer, and the pipeline went through on schedule.

Using coatings that have to be prepared at the site would have been much more difficult in this type of country.

Learn more about Polyken protective coatings. Write, wire or phone *Polyken Sales Division*, 309 W. Jackson Blvd., Chicago 6, Ill. WEbster 9-7100.

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DEPT/Personals

A. E. Pecore

W. S. Spangler

A. E. PECORE is the new president of Humble Pipe Line Co., Houston. **WILLIAM S. SPANGLER** replaces him as vice-president. Pecore succeeds **O. Q. Lomax,** who has retired after serving since 1950. **P. D. Phillips, Jr.,** formerly assistant general superintendent of the company, succeeds Spangler as general superintendent. He also has been named a director.

PAUL L. KELLY, Calvert Drilling, Inc., Bismarck, N. D., has been elected president of the North Dakota Oil & Gas Assn., succeeding **William F. Grinnan.** New vice-presidents elected include **Thomas Leach,** North American Royalties; **William E. Sloan,** Ohio Oil Co., and **William R. Strickland,** Skelly Oil Co., all from Bismarck; and **Bruce Alfson,** Williston Basin Development Co., Williston. **Clifford Jansonius,** Bismarck attorney, is the new secretary. Five new directors are **Don Sarber,** Sinclair Oil & Gas Co.; **Clarence J. Franks,** Pan American Petroleum Corp.; and **William Frazer,** Pure Oil Co., all of Bismarck; and **Willist Dupuy,** Continental Oil Co., and **E. R. Warr,** Shell Oil Co., both of Billings, Mont.

THOMAS D. RUSH has opened offices as a consulting geologist in Houston. For the past three years he has been with The Texas Co., in charge of geology for all salt dome exploration and development on the Texas Gulf Coast.

DEAN HUTCHINGS has been appointed Pure Oil Co.'s Denver Basin scout, with headquarters in Denver.

J. H. SMITH has been promoted to manager of manufacturing for Continental Oil Co.'s southern and southwestern regions, succeeding **H. R. Wall,** who recently moved up to general manager of transportation and supplies. **Daniel F. Cameron** will succeed Smith as chief engineer in the manufacturing department. Smith will supervise refinery operations at Lake Charles, La., Wichita Falls, Tex., and Artesia, N. M. His headquarters will be in Houston.

ANTHONY F. KEATING, president of Keating Drilling Co., will be chairman of the housing bureau for the 1959 International Petroleum Exposition in Tulsa. The bureau will be in charge of all reservations for housing made for the May 14-23 show, and will cooperate with the Tulsa Hotel Men's Assn. Attendance at the show is expected to top 30,000.

JACK TIELROOY, formerly vice-president in charge of commercial development for Brea Chemicals, Inc., has established consulting chemical engineering offices in Fullerton, Calif. Prior to Brea's formation in 1952, he was with its parent company, Union Oil Co. of California, and with Shell Chemical Corp. He plans to specialize in Western chemical industry.

W. J. (Bill) ALBERTSON has joined Kerr-McGee Oil Industries, Inc., Oklahoma City, as advertising and sales promotion assistant. He was formerly with Leslie Brooks & Associates, market research consultants, of Tulsa.

CHARLES W. SKJOD has replaced **Fredric R. Tiddens** as scout in the Bismarck office of Amerada Petroleum Corp.

RAYMOND H. COE, division petroleum engineer for Tidewater Oil Co.'s central division production department, has been promoted to assistant manager of production at Tulsa. He will be succeeded by **Wendell J. Haugh,** formerly assistant division petroleum engineer at Tulsa. Haugh, in turn, will be succeeded by **William E. Perkes,** production manager of the four-company oil exploration and production group at Regina, Sask., for which Tidewater serves as operator.

JOHN E. ADAMS has been appointed senior staff regional geologist for Standard Oil Co. of Texas, in Midland, Tex. He has been with the company since 1927. In 1953, he was president of the American Assn. of Petroleum Geologists.

JAMES W. ROCHE has been appointed production manager for the Calgary area for Shell Oil Co., with headquarters at Calgary. He was formerly division production manager of the Denver area.

J. W. Roche

J. M. Saunders

JACK M. SAUNDERS has been promoted to division geologist for Continental Oil Co.'s Corpus Christi (Tex.) division. He was formerly assistant to Conoco's southern region geologist. He succeeds **Lloyd Ryman,** who has transferred to Caracas, Venezuela, as a member of the staff of Conoco's newly organized Venezuelan subsidiary. **R. W. Blair** will succeed Saunders.

INTERMOUNTAIN OIL CORP., Casper, Wyo., has been formed by a group of local residents. Directors of the new company are **R. R. Rose, Jr.,** attorney, Assistant Secretary of the Interior during the Truman Administration, **Gene B. Caperton,** engineering and geological consultant, formerly associated with the Casper National Bank, **Walter H. Wolford, Jack W. Perry, John D. Hoover, W. M. Shepherd,** and **Dan C. Morton.**

LLOYD M. BENTSEN, JR., is president, and **J. F. CORLEY** executive vice-president of Marine Drilling, Inc., Houston. The new company was established by the merger of American Tidelands, Inc., New Orleans, and Marine Drilling, Inc., Houston. Other officers and directors of the firm are **William F. Wallis,** secretary-treasurer; **John G. Jacquemine,** assistant secretary-treasurer; **Robert G. Rice; Frank H. Crerie,** all of Houston; **Jack Frost** and **Alfred E. McLane,** Dallas; and **Walter Carroll, Sr.,** New Orleans. **John S. Welsh** of New Orleans has been appointed superintendent.

T. P. Simpson

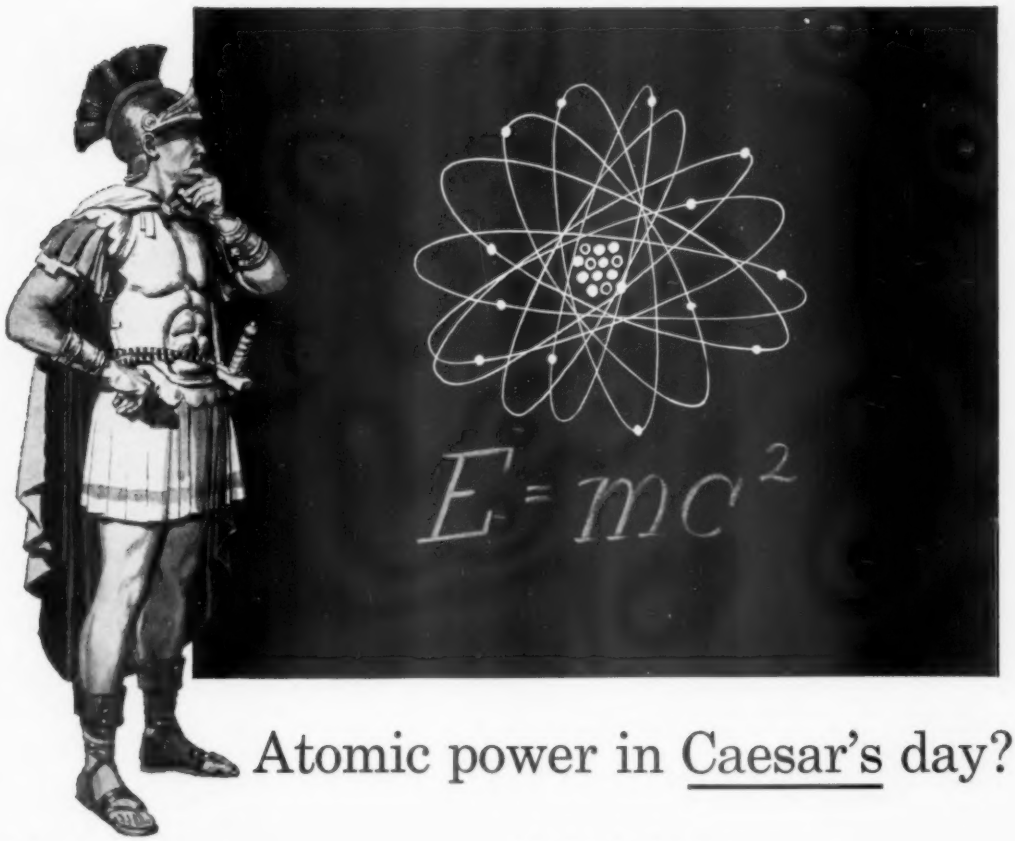
R. R. Jackson

R. REA JACKSON has been appointed chairman of Socony Mobil Oil Co.'s coordination committee. **THOMAS P. SIMPSON** succeeds him as general manager of the manufacturing department, and chairman of the manufacturing committee. Jackson succeeds **Frederic R. Pratt,** who is retiring. Pratt joined the company 26 years ago, and assumed the post of chairman of the coordination committee in 1953. Simpson has been vice-president and director of manufacturing for General Petroleum Corp., West Coast Socony affiliate.

JESS W. MARSHALL has opened custom drafting offices in Denver to serve the oil industry. He was formerly associated with Thurman Consultants.

AUDLEY E. HARNSBERGER has been elected president of Pure Transportation Co., wholly owned pipeline subsidiary of Pure Oil Co. He succeeds **J. W. Meehan,** who has resigned.

W. A. ALEXANDER, vice-president of exploration and production in the Denver area for Shell Oil Co., has been chosen Rocky Mountain district chairman of the Oil Information Committee. He succeeds **H. E. Prunty,** of Standard Oil Co. (Ind.), who was recently transferred to Des



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It was there, in the ground, in the air and water. It always had been. There are no more "raw materials" today than there were when Rome ruled the world.

The only thing new is knowledge . . . knowledge of how to get at and rearrange raw materials. Every invention of modern times was "available" to Rameses, Caesar, Charlemagne.

In this sense, then, we have available *today* in existing raw materials the inventions that can make our lives longer, happier, and inconceivably easier. We need only *knowledge* to bring them into reality.

Could there possibly be a better argument for the strengthening of our *sources* of knowledge—our colleges and universities? Can we possibly deny that the welfare, progress—indeed the very *fate*—of our nation depends on the quality of knowledge generated and transmitted by these institutions of higher learning?

It is almost unbelievable that a society such as ours, which has profited so vastly from an accelerated accumulation of knowledge, should allow anything to threaten the wellsprings of our learning.

Yet this is the case

The crisis that confronts our colleges today threatens to weaken seriously their ability to produce the kind of graduates who can assimilate and carry forward our rich heritage of learning.

The crisis is composed of several elements: a salary scale that is driving away from teaching the kind of mind *most qualified* to teach; overcrowded classrooms; and a mounting pressure for enrollment that will *double* by 1967.

In a very real sense our personal and national progress depends on our colleges. They *must* have our aid.

Help the colleges or universities of your choice. Help them plan for stronger faculties and expansion. The returns will be greater than you think.

If you want to know what the college crisis means to you, write for a free booklet to: HIGHER EDUCATION, Box 36, Times Square Station, New York 36, New York.

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Philadelphia 3 — W. A. Potter
Architects Building
Rittenhouse 6-0670

San Francisco 4 — William C. Woolston
68 Post Street
Douglas 2-4600

Tulsa 3 — J. A. Hartley
909 Enterprise Bldg.
522 South Boston

England, London E. C. 4 — Herbert Lagler
McGraw-Hill Co., Ltd.
95 Farringdon St.

Moines. **Howard E. Hoelter** has been promoted to senior district representative in OIC's Great Lakes district. He succeeds **Robert E. Harris**, who recently resigned. Hoelter has been a member of the Great Lakes district staff in Chicago since January, 1956.

W. S. Peeler

W. T. Herget

WINSTON S. PEELER has been elected vice-president in charge of manufacturing for American Oil Co., New York. **WALTER T. HERGET**, formerly manager of operations in the manufacturing department in New York, succeeds Peeler as general manager of manufacturing. Peeler, also elected a director, replaces the late **Dr. Harold R. Snow.**

DR. JOHN H. HEGE will head the newly established medical department of Ohio Oil Co., Findlay, Ohio.

J. W. HAZZARD has been promoted to assistant division foreman in General Petroleum Corp.'s pipeline department, at Taft, Calif.

WAYNE FISHER has been promoted to superintendent of The Texas Co.'s south coast district, with headquarters in Santa Paula, Calif. **Don Grosskurth,** former assistant superintendent of Texaco's Los Angeles Basin district, has replaced Fisher as assistant superintendent of the San Joaquin Valley district, headquartered in Bakersfield. **R. B. Palmer,** district geologist in the San Joaquin Valley district, has been transferred to the office of the chief geologist, in Houston. He will be succeeded by **K. E. Myron,** formerly geologist for the north coastal district at Santa Maria, Calif. Myron, in turn, will be succeeded by **Joe Ernst,** a geologist at Santa Maria. **P. B. Harris,** geologist in Texaco's Los Angeles division office, has been promoted to district geologist of the Los Angeles Basin district, with offices at Long Beach. He will be succeeded by **D. E. Six,** geologist in the San Joaquin Valley district. **J. W. Learmont,** geologist in the same district, has been transferred to Texaco's Louisiana division, headquartered in New Orleans.

H. H. CHANDLER, superintendent of The Texas Co.'s Eagle Point refinery at Westville, N. J., has been assigned executive duties in London, England, as deputy shareholder's representative. He will spend three months studying other phases of Texaco's operations before reporting to the London office. He will be succeeded by **V. K. Brandenburg,** assistant superintendent of Texaco's Lawrenceville (Ill.) refinery. The latter will be succeeded by **C. T. Swan,** assistant superintendent at the Casper refinery. And Swan, in turn, will be succeeded by **G. A. Collins, Jr.,** assistant supervisor, refinery production division, New York.

TIDEWATER OIL CO.'s new Delaware refinery has six new supervisors. **George M. Rose** has joined the company as group leader of refinery technology. He was formerly chief operator for the start-up of a Houdriformer unit in Germany for Houdry Process Corp. **Frank A. Holt** has been named area shift leader of the reforming and extraction area. And **Henry J. Fleiner, Jeff C. Hunter, Fred W. Oaks,** and **Raymond Weitzel, Jr.,** were appointed area shift leaders of the blending area.

HOWARD BOYD, vice-president, director, and assistant general counsel of El Paso Natural Gas Co., New York, has been named to the newly created post of executive vice-president. He will move from Houston to New York in October. He joined the company in August, 1952. He is also vice-chairman of the board of Pacific Northwest Pipeline Corp., and an officer and director of other El Paso subsidiaries.

H. Boyd

K. King

KERRYN KING has been appointed general manager of the industrial and public relations department of The Texas Co., New York. He was formerly assistant general manager and director of public relations. He will be succeeded as director of public relations by **Thomas D. Durrance,** who was formerly supervisor of editorial services. **Robert T. Kenney** and **Thomas F. Brawner** have been named assistants to the director of public relations, with headquarters in Los Angeles and Houston, respectively.

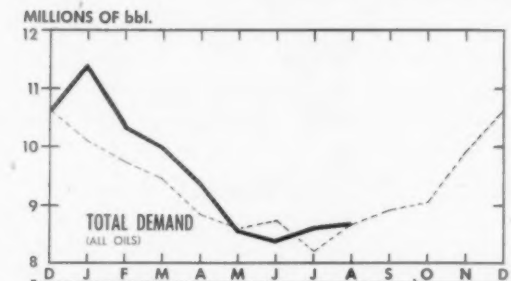
W. H. BADE has been appointed special assistant to the vice-president, marketing, of California Standard Western Operations, Inc., at San Francisco. He was formerly San Diego division manager of retail sales for California Standard.

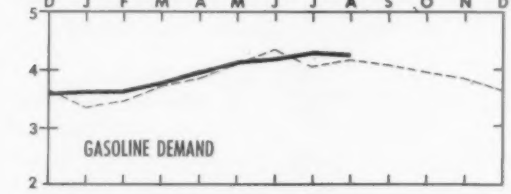
DUPREE McGRADY, president of Casper Geological Society, is an employee of Western Geophysical Co., Casper, not Eastern Geophysical Co., as previously reported in PETROLEUM WEEK.

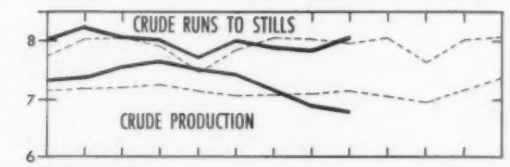
ROBERT KIRK has joined Amoco Chemicals Corp., Chicago, as manager of international sales. He was formerly manager of the foreign division of Pittsburgh Coke & Chemicals Co., New York, and president of Pittsburgh Chemicals Mexicana S. A.

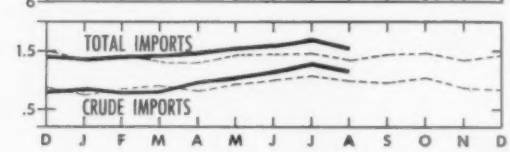
PETROLEUM WEEK'S

Fingertip Figures









RUNS TO STILLS

Latest week	8.270
Previous week	8.327
Year ago	8.187

CRUDE PRODUCTION

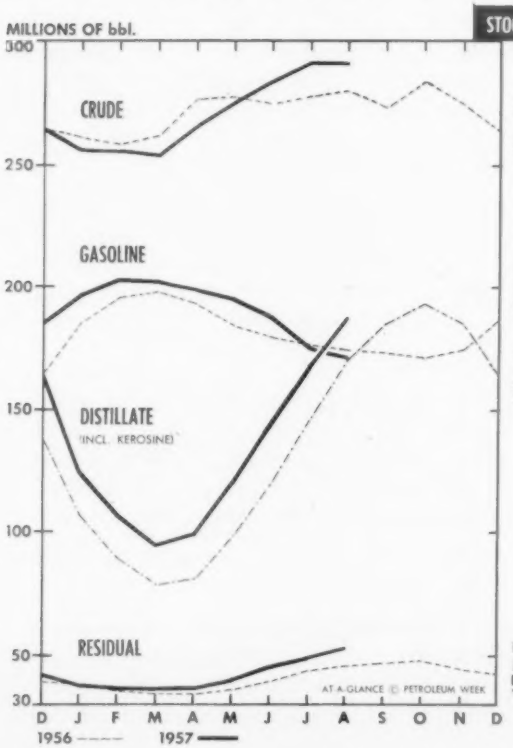
Latest week	6.807
Previous week	6.766
Year ago	7.037

TOTAL IMPORTS

Latest week	1.795
Previous week	1.457
Year ago	1.305

CRUDE IMPORTS

Latest week	1.400
Previous week	1.136
Year ago	.975



CRUDE STOCKS

Week-ended	
8-31	284.2
Previous week	287.7
Year ago	279.9

DISTILLATES

Latest week	194.7
Previous week	188.3
Year ago	175.4

GASOLINE

Latest week	173.6
Previous week	171.7
Year ago	176.0

RESIDUAL

Latest week	54.0
Previous week	52.5
Year ago	47.2

Supply-Demand Figures for August

(millions of b/d)

	August 1957	% Change from year ago	8 Months 1957	% Change from year ago
Total Demand (Inc. Exports)	8.671	....	9.434	+4.3
Gasoline	4,217	+1.2	3.972	+2.5
Distillates (Inc. Kerosine)	1.403	+2.4	2.086	+3.3
Residual	1.351	—0.6	1.625	+1.8
Total Supply	9.074	—3.2	9.657	+3.3
Domestic Crude	6.800	—5.5	7.333	+2.4
Nat. Gas Liquids	.750	—3.7	.804	+3.2
Total Domestic	7.550	—5.3	8.137	+2.5
Crude Imports	1.165	+16.4	.988	+6.5
Total Imports	1.524	+8.9	1.520	+8.0

Statistics for August present something of an oddity for the industry. There was a decline from a year previous in the volume of new supply, the first since October, 1954.

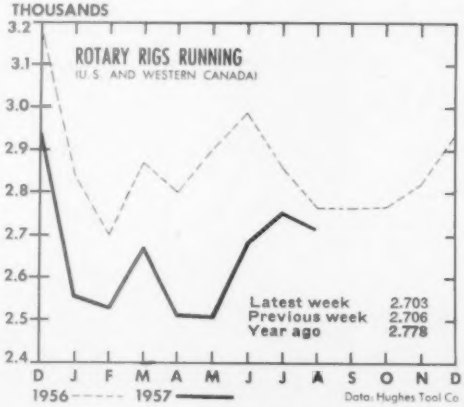
And while total new supply for the month exceeded demand (a normal expectation in the summer months), it was nothing like the excess in July and June.

Total new supply averaged 403,000 b/d higher than demand in August, compared with a supply excess of 700,000 b/d in July and more than 1-million b/d in June.

The cut in the rate of new supply was due to a 395,000 b/d drop in domestic crude production and a decline of 29,000 b/d in U.S. output of natural gas liquids.

Crude imports ran 164,000 b/d higher than last August, and total imports were up 125,000 b/d.

Demand in August was just about equal to a year ago, which helped to pull the rate of gain for the year to date down slightly. Demand for gasoline and middle distillates ran only slightly above the year-ago rates.



The Market Trend

All Time Tables Are Subject to Change

The seasons can set a time table for pricing only if all other factors that influence prices are on schedule. And when just one factor is off schedule, the whole time table can be subject to change.

Such is the case with LPG prices, which moved up cautiously last week. The advances made by some suppliers of propane ranged from 0.25¢ a gal. at the Gulf to 0.5¢ a gal. in the Southeast.

Seasonally, the price advance for LPG is on time. But other factors are not following schedule. Primarily, a surplus inventory position poses a serious threat to the higher prices. The latest API report shows that total LPG inventories of 964.6-million gal. are 56.7% above a year ago. Suppliers generally estimate that the volume in storage represents from 80% to nearly 100% of capacity.

Demand for LPG has been running behind the anticipated schedule. There has been some pick-up in buying in recent weeks, but it was not due to a hike in consumption. Rather it represented moves by buyers to get ahead of the anticipated price increase and the hike in freight rates that became effective Aug. 26.

And there is no reason to believe demand will pick up before mid-October, unless the weather should turn colder than normal. The summer buying to establish the traditional winter purchase ratios is over. Such purchases are made to establish a favorable buying ratio by customers for the normally tight-supply winter months, when LPG consumption is at its peak. But there is nothing currently to stimulate sales other than cold weather. And when stocks are high, the desired change in weather can be a long time in coming.

Natural Is Heavy:

The seasonal time table for natural gasoline could be subject to change, too. Prices normally turn stronger as fall approaches, particularly if gasoline demand is running high. And while gasoline demand now is relatively good, all the strength comes from the upper Midwest. Little of any of the stronger demand is being felt on the Gulf Coast.

The problem with natural gasoline, though, goes beyond the status of current inventories. The low-octane value of the material does not fit into the present needs of refiners who have developed new techniques for making gasoline. And, while output from the increasing number of field process plants continues to rise, demand points downward.

Interest Stirs In Distillates:

Approaching fall is beginning to stir up "shopping interest" in distillates—but so far the buyers are strictly shopping. The big terminal operators are still playing their summer-long waiting game with refiners who want to see movements of burning oils started. Gulf Coast refiners figured the "game" would be over in September, and buying would start.

But now that September is here the buyers still want to play. Material scheduled for September lifting is being set back to October.

The Reason: Buyers know that many coastal and inland refiners are still topheavy on distillates and gasoline stocks, despite some improvement in gasoline recently. They figure that, by holding back, they can get price concessions even bigger than the sizeable discounts available now.

The Market Place

AROUND THE WORLD

Prices compiled for PETROLEUM WEEK by Platt's OILGRAM Price Service and National Petroleum News, McGraw-Hill Publications

All Prices as of September 9

Bold face type indicates changes from previous week

KEY PRICES—REFINED PRODUCTS

(¢ per gal. except dollars per bbl. where $ is shown)

Western Hemisphere

U.S. Gulf Coast, cargoes
- Gasoline, 98 oct prem. . . . 13.25-14.375
- Gasoline, 92 oct reg. . . . 11.5-12.625
- Kerosine 9-11
- Heating oil, No. 2 . . . . 9-10.5
- Gas oil, 48-52 d.i. . . . 9.25-10.625
- Fuel oil, bunker "C" $2.55-3.15

Caribbean, cargoes
- Avgas, Grade 100/130 . . . . 17.5
- Gasoline, 93 oct research prem. . . . 11.75
- Gasoline, 87 oct research reg. . . . 10.875
- Gasoline, 79 oct research 10.125
- Gasoline, 70-72 oct motor method 9.75
- Kerosine 9.25
- Heating oil, No. 2 9
- Gas oil, 48-52 d.i. . . . 9.25
- Fuel oil, bunker "C" $2.55

New York Harbor, barges
- Kerosine 10.75-11.25
- Heating oil, No. 2 . . . . 10.25-10.75
- Fuel oil, No. 6 . . . . $2.95

Okla-Group 3, northern, shpt, bulk
- **Gasoline, 89 oct reg . . . . 12↑-12.25**
- Kerosine 10-10.5
- **Heating oil, No. 2 . . . . 9-9.375↓**
- Fuel oil, No. 6 . . . . $2.05-2.15

Chicago, bulk
- Gasoline, 91 oct reg 13-13.8
- Heating oil, No. 2 . . . . 9.5-10.65
- Fuel oil, No. 6 high sulfur 8.1-8.2

Los Angeles, rack
- Gasoline, 84 oct reg 13.6
- Diesel fuel, PS 200 . . . . 10-11.25
- Light fuel, PS 300 . . . . $3.40-3.65
- Heavy fuel, PS 400 . . . . $2.85-3.05

Natural Gasoline, Grade 26-70
- FOB Group 3 4
- FOB Breckenridge, Tex 3.5

LP-Gas
- Propane, Oklahoma (Group) 3.5-5

Penna Lubes
- Bright stock, 25 p.t. . . . 27
- 200 vis. neutral, 25 p.t. . . . 25

Mid-Continent Lubes, Tulsa basis
- Bright stock, solvent, 95 v.i. . . . 25.5-26.5
- Neutral, solvent, 200-210 vis. . . . 21.25-22.25

Gulf Coast Lubes
- Bright stock, solvent, 95 v.i. . . . 26.5
- Neutral, solvent, 200 vis. . . . 23

Eastern Hemisphere

Singapore (Pulau Bukom), cargoes
- Avgas, grade 100/130 . . . . 18.625
- Gasoline, 79 oct research 10.5
- Kerosine 10.375
- Gas oil, 48 d.i. minimum 10.375

KEY PRICES—CRUDE OIL

(2¢ differential per deg. of grav. applies except as noted)

Western Hemisphere

United States (at the well)
- Mid-Continent, 36.0-36.9 . . . . 3.07
- North Dakota, 36.0-36.9 . . . . 3.07
- Texas:
  - Gulf Coast, low cold test, 26.0-26.9 . . . . 3.50
  - G. Coast, Upper & Lower, 26.0-26.9 . . . . 3.07-3.22
  - West Texas, sweet, 36.0-36.9 . . . . 3.07
  - West Texas, N. M., inter., 36.0-36.9 . . . . 3.00
  - West Texas, N. M., sour, 32.0-32.9 . . . . 2.86
  - East Texas, flat 3.25
  - Mirando, 28.0-28.9 . . . . 3.31
- Illinois Basin, flat 3.15
- Pennsylvania Grade, Bradford dist. flat 4.65
- California, Signal Hill, 21.0-21.9 . . . . 2.93†
- North Louisiana-Arkansas, 36.0-36.9 . . . . 3.20
- Wyoming sweet, 36.0-36.9 . . . . 3.00
- Wyoming sour, 32.0-32.9 . . . . 2.71

Canada (flat prices, at the well)
- **Acheson-Stony Plain (Alta.) . . . . 2.68↓**
- **Leduc-Woodbend (Alta.) . . . . 2.74↓**
- **Redwater (Alta.) . . . . 2.63↓**
- **Daly (Man.) . . . . 2.46↓**
- **Smiley (Sask.) . . . . 2.40↓**

Venezuela (Cargoes, FOB lifting port designated)
- Cumarebo ,48.0-48.9, Tucupido 3.75
- San Joaquin, 41.0-41.9, Puerto la Cruz 3.34
- Oficina, 35.0-35.9, Puerto la Cruz 3.05
- Tia Juana, Medium, 26.0-26.9, Amuay 2.55
- Bachaquero, flat, Amuay, Las Piedras 2.23
- Tarra, 38.0-38.9, San Lorenzo 3.08
- Lagunillas Heavy, flat Amuay 3.28
- Cardon 2.20

†Differential per deg. of grav. varies.

Eastern Hemisphere

Middle East, Persian Gulf (Cargoes, FOB lifting port)
- Arabia, 34.0-34.9, Ras Tanura 2.08
- Safaniya, 27.0-27.9, Ras Tanura 1.79
- Iran, 34.0-34.9, Bandar Mashur 2.04
- Iran, 34.0-34.9, Abadan 1.99
- Iraq, 35.0-35.9, Fao 1.98
- Kuwait, 31.0-31.9, Mina-al-Ahmadi 1.85
- Qatar, 41.0-41.9, Umm Said 2.23

Middle East, Eastern Mediterranean
- Arabian, 36.0-36.9, Sidon 2.69
- Iraq, 36.0-36.9, Tripoli, Banias 2.69

Far East, Cargoes, FOB Lutong, Sarawak
- Seria Light, 37-38 . . . . 2.75

KEY TANKER RATES

(Last paid, per long ton, single voyage)

U.S. Gulf-N.Y., clean . . . . (USMC —37½%) $1.78↓
U.S. Gulf-N.Y., dirty . . . . (USMC —35%) $1.85
NWI-USNH, dirty . . . . (USMC 55%) $1.22
NWI-UK/Cont., dirty . . . . (Scale —30%) 22/9*
Pers. G.-UK/Cont., dirty . . . . (Scale —57½%) 26/7*
Persian Gulf-USNH, dirty . . . . (USMC —50%) $6.35

**Sterling*

HAROLD WHITELY will manage sales in the Permian Basin area for Baash-Ross Tool Co., a division of Joy Mfg. Co. He has been a field representative in the Odessa (Tex.) area, and will continue to make his headquarters there.

H. Whitely

A. F. Schroeder

ALLAN F. SCHROEDER has been appointed director of purchasing for Cardwell Mfg. Co., Wichita, Kan. He was formerly advertising and sales promotion manager for the company. He has been with the company for 14 years.

FOSTER WHEELER CORP. has opened an office in Seattle, Wash., to serve Idaho, Montana, Oregon, and Washington. **S. P. Trewin,** district sales manager, will supervise the new office.

R. H. TIPTON has been named acting superintendent of Loffland Brothers Co.'s West Texas-New Mexico division. He replaces **J. D. Poe.** Tipton has been with Loffland since 1930, and for the past six years has been assistant superintendent of the West Texas-New Mexico division.

ERNEST W. POLLEY has been appointed chief chemist for the Youngstown district of the Youngstown Sheet & Tube Co. He was formerly assistant chief chemist. He succeeds the late **L. C. Flickinger. Fred E. Theis** has been named superintendent of shops at the Indiana Harbor Works of Youngstown Sheet & Tube, and **Norman P. Hitchcock** has been named superintendent of maintenance and power there.

T. P. DELLONE, manager of Jones & Laughlin Supply Division's Sherman (Tex.) store, has been transferred to Farmington, N. M. as store manager. **C. W. Campbell,** storeman at Best, Tex., becomes store manager at that location.

E. S. FRASER, formerly manager of Chicago Bridge & Iron Co.'s Salt Lake City plant, has been named assistant general manager, in Chicago. **Buell Moore,** on the engineering department staff in the Birmingham (Ala.) plant since 1949, transfers to the New York sales office. **Elwood Garrett,** formerly in the Houston erecting district, is transferring to the New Orleans office.

OBIE L. STALCUP, Rocky Mountain division manager for Halliburton Oil Well Cementing Co. for the past seven years, has been transferred to Lubbock, Tex. He will assume responsibility for the Lubbock division. He will be succeeded by **Joe Maly,** assistant Rocky Mountain division manager in 1955, and currently manager of the Tulsa division.

LELAND HAMMER CO., Houston, has been appointed Gulf Coast representative of Hercules Tool Co., Tulsa. Leland also has representatives in Corpus Christi and in Lafayette and Houma, La.

WILLIAM C. BEDOIT, JR., will manage market development for Jefferson Chemical Co.'s commercial development division, at Houston. He has been senior research chemist at the firm's Austin (Tex.) laboratories since 1954.

WORNOCK HIPP, JR., JACKIE R. HUNNICUT, and **FRANK MUMFORD, JR.,** have been appointed field representatives of U. S. Steel Corp.'s Oil Well Supply division in Hobbs, N. M., and Denver City, and Odessa, Tex., respectively. **George A. Boring,** field representative at Odessa, is transferring to Kermit, Tex., in a similar capacity.

R. E. BAYLES will manage the Casper office of Schlumberger Well Surveying Corp. He is being transferred from Riverton, Wyo. He succeeds **Robert Jones,** who resigned to establish a consulting service in electric well log interpretation in Casper.

JOSEPH L. NEWMAN and **WILLIAM D. BRAMHAM** have formed Western Wireline Service in Bakersfield, Calif. The new company will offer all phases of wireline service work, including jet perforating. Newman was formerly with Lane-Wells Co., and Bramham was with Eastman Oil Well Survey Co.

S. B. HODGES will coordinate activities of the newly formed plastics products department at Dresser Mfg. Division, one of the Dresser Industries, at Bradford, Pa. The department was established to develop and market plastic products for the joining, repairing, and maintenance of pipe. Hodges is marketing manager for the division.

S. B. Hodges

M. T. Works

MADDEN T. WORKS has been appointed manager of operations for the Dresser Turbodrill Division, one of the Dresser Industries, in Dallas. He was formerly president of Pioneer Specialties, Inc., Houston manufacturer of oilfield equipment.

DONALD K. BALLMAN has been promoted to director of sales for Dow Chemical Co., Midland. He was formerly general sales manager. He succeeds **Donald Williams,** recently appointed director of corporate relations. **William R. Dixon,** formerly assistant general sales mangaer, will succeed Ballman.

CHARLES E. PRICE as been transferred from the Shreveport offices of Murphy Corp. to Denver, where he will be assistant division production superintendent for the company.

MAX A. CARLEY has been appointed to the newly created post of divisional accounting coordinator of Consolidated Electrodynamics Corp., Pasadena, Calif. He joined Consolidated in October, 1956, as a general supervisor.

NORMAN WILLIAMS is the new head of the perforating division of Elgen Corp., in Dallas. In line with the expansion of the company, five new managers have been named. They are **Ernie Young,** Shreveport, La.; **Dick Heard,** Natchez, Miss.; **John Yerger,** Thibodeaux, La.; **Max Mitchell,** El Dorado, Ark.; and **Jim Moore,** Wichita Falls, Tex. Three new sales representatives are **Custer Sokolosky,** Shreveport; **Charles Franklin,** Seymour, Tex.; and **Cliff Strozier,** Tulsa.

T. C. FICKEN has been appointed sales manager in Atlanta, Ga., of the southeastern U. S. area of A. O. Smith Corp. He was formerly sales representative in Atlanta.

W. J. HESSIN has been appointed sales engineer for Granberg Corp., Oakland (Calif.) manufacturer of Granco positive displacement pumps, meters, and accessories. He has had 18 years' experience in design, engineering sales, service, and operating engineering before joining Granberg.

W. J. Hessin

S. B. Ring

SIDNEY B. RING has joined Petrolite Corp., as patent attorney, in Webster Groves, Mo. He formerly held a similar position for General Electric Co.

LEONARD H. SEEMAN becomes manager of the products sales engineering department of Greer Hydraulics, Inc., Jamaica (N.Y.) manufacturer of hydropneumatic accumulators and hydraulic components for the petroleum, aviation, and general industrial fields. He joined Greer in 1945 as a design engineer.

CLASSIFIED

DISPLAYED RATE

The advertising rate is $12.60 per inch for Equipment and Business Opportunity advertising appearing on other than a contract business.

EMPLOYMENT OPPORTUNITIES

The rate is $17.05 per inch. Subject to Agency Commission.

UNDISPLAYED RATE

$1.50 a line. Minimum 3 lines. Box numbers count one additional line.

POSITION WANTED. Undisplayed rate is one half of above rate, payable in advance.

DISCOUNT of 10% if full payment is made in advance of four consecutive insertions of undisplayed ads.

AN ADVERTISING INCH is measured ⅞ inch vertically on one column, 3 columns—30 inches—to a page.

Send NEW ADS or Inquiries to Classified Advertising Division, PETROLEUM WEEK, P. O. Box 12, New York 36. Issue closes 10 days prior issue date.

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with affiliate of
STANDARD OIL COMPANY (N. J.)
in
PERU & COLOMBIA, SOUTH AMERICA

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Degree plus 2 to 8 years experience

Drilling Engineers
Degree plus 3 years as Drilling Engineer and total 5 years in Petroleum industry

Cost Engineer
Degree, must be well grounded in Crude Oil Producing Operations to deal with cost control problems, analysis of operating expenses, capital budgets, etc.

Gasoline Plant Engineer
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WRITE giving age, marital status, education and details of previous experience.

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RADIO CITY STATION
New York 19, N.Y.

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Our continuing growth as the leader in our respective field requires the immediate acquisition of a B.S. Chemist and/or Chemical Engineer with the following backgrounds:

- ***Petroleum Specialist***
  With two to five years experience in petroleum production or refining.
- ***Polymer Specialist***
  Here we seek a man with two to five years broad experience in either plastics or rubber.

We Offer You—

Dependent upon your training and/or experience the responsibility for our marketing developments to the Petroleum, Plastics and Rubber Industries.

You will be fortified by having the finest research, test, development, and production facilities at your disposal.

The excellent opportunity for advancement and our broad employee benefit program offers an ideal future for you.

Please outline, in reasonable detail, your background, education, experience and salary requirements. We will then try to arrange an early meeting, at your convenience, to discuss your potentialities in our rapidly expanding operation.

Of course, your inquiry will be kept in absolute confidence.

Personnel Manager
Armour Chemical Division
1355 West 31st Street Chicago 9, Illinois
Leader in *Progressive* Fatty Acid Chemistry

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If you've had successful experience in selling petroleum marketing equipment to majors, independents and dealers, we'd like to hear from you. World-wide manufacturer of service station equipment has an opening for sales representative to cover middle western territory. A salaried position with advancement opportunities. Our men know of this ad and all replies will be held in strict confidence.

Write to:

SW6028 Petroleum Week, Class. Adv. Div., P.O. Box 12, N. Y. 36, N .Y.

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Chemical Engineer—Excellent opportunity with a West Coast Independent Oil Company (San Joaquin Valley). Refinery Experience, Process Design and Operation essential. Must have Engineering Degree. Salary commensurate with ability and experience. Reply outlining personal history, photograph and work background. P-6098, Petroleum Week, Class. Adv. Div., P.O. Box 12, N.Y. 36, N.Y.

BUSINESS OPPORTUNITY

8500 Acres South Dakota ranch. 7200 acres minerals leased to Major Oil Co. $30 acre. Wells Land Co., Nowata, Okla.

PROFESSIONAL SERVICES

OIL HUNTERS

No longer need rely on misleading guess-work. Avoid expensive false hopes raised by deceptive methods. Eliminate costly, unnecessary corehole drilling.

Here is a direct reading oil detector that can eliminate dry-hole drilling by pointing out where not to drill, as well as where to drill for oil and its appropriate depth.

This Direct Reading Oil Detector can tell if there are one or more oil zones to a depth of 4 miles; also the limits of production outlined around a wildcat producing well.

Will make locations for fee and expenses.

Reply to HENRY A. DODGE
916 South Georgia Street
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Congratulations Are In Order

IT BEGINS TO LOOK as if the government's new voluntary imports-control plan may work. And the majority of importers are to be congratulated on the steps they have taken so far toward compliance with the plan. Crude imports currently are still higher than the plan's ceiling of 1,031,000 b/d. But the ceiling represents an average rate to be met in the 12 months ending next June.

The indications now are that the great majority of the importing companies plan to hold their imports within the recommended average. Such assurance was indicated by the importing plans filed by the companies last month with the Texas Railroad Commission. While crude imports in September will average nearly 100,000 b/d above the recommended ceiling, the total during the final three months of the year will be within 8,000 b/d of the desired level.

Under the imports control plan, all of the cutbacks from the previously announced importing rates have to be made in Districts I-IV, the portion of the U.S. east of the rockies. The latest reports filed in Texas show that crude imports in those districts during the final three months of the year will be trimmed by about 200,000 b/d, to an average of 766,000 b/d. At that level, final-quarter imports will be within 10,000 b/d of the desired ceiling.

OBVIOUSLY, NOT ALL IMPORTERS AGREE that the ceilings imposed are proper. As was evidenced in the hearing in Washington this week, some companies feel the cuts ordered for them will put them at a competitive disadvantage. Others report that their contractual agreements prevent them from making the required cuts.

But all in all, the actions taken so far represent substantial compliance. It is to be hoped that, during the 12-month duration of the plan, compliance will be close to 100%. For, despite the minor inequities in the plan, a voluntary plan is better for everyone than the inevitable alternative—government regulation of any phase of the oil industry.

A Dollars and Cents Approach

ONE TEXAS INDEPENDENT has started a campaign to stress the importance of oil operations to his local community. It's a form of grass-roots public relations with a dollars and cents impact.

Lester Clark, of Breckenridge, a partner in The Idex Co., Daniel & Clark, and Graridge Corp., devised a slogan that is imprinted on all checks and purchase orders of the three companies. It reads: "Foreign Oil Did Not Make This Purchase Possible."

From Oasis to Igloo

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It has been, and will continue to be, an important part of Halliburton's policy to "Make service available everywhere, regardless of climate, difficulties of terrain, or distance"!

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Over 142 NBC STATIONS, NOVEMBER 21st

"The Innocent Years". Recaptured from exciting old films and newsreels, you'll see happy days relived. Experience the excitement of "Teddy" Roosevelt, Thomas Edison and Mark Twain in action. Hear songs like: "In the Good Old Summertime", "He'd Have to Get Out and Get Under". Enjoy the fun of family picnics, the joys of people in the last untroubled time in our history.

And commercials that help you sell . . .

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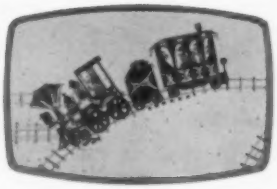
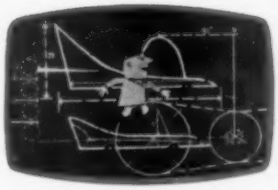
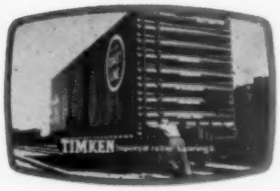


See Why America's railroads have always led the world.



See Why Americans jump for the latest thing in cars.



See One man push a freight car all by himself.

Years of national and trade advertising, backed by their superior performance, have made "Timken" the best-known name in bearings—a name that helps to sell the products that use Timken® bearings. Now, network television will build even a greater awareness of Timken bearings—make them an even bigger sales plus in the equipment you sell. The Timken Roller Bearing Company, Canton 6, Ohio. Cable address: "TIMROSCO".

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